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EDITORIAL NOTE

Omicron Chi Epsilon, the National Honor Society in Economics, was founded in 1956 with the aim of stimulating interest in economics among students in American colleges and universities, and of providing a means of conferring suitable honors on the more promising students working in this field. The Society provides a forum for academic intercourse between graduate and undergraduate students of economics across the country, and thus facilitates cross-fertilization of ideas among budding members of the profession. The American Economist, the official Journal of Omicron Chi Epsilon, is potentially the most valuable vehicle for promoting the basic aims of the Society, and should thus be geared towards best serving this end. The editorial policy of the Journal has thus been formulated accordingly, and will no doubt gradually adjust to suit the changing needs of the Society. At present it is thought that the Journal can best serve its purposes by (i) providing an outlet for meritorius essays and papers written by graduate and undergraduate students, of a nature not normally catered for by existing professional journals, but of sufficient interest and merit to warrant publication, and (ii) providing a means of acquainting would-be economists, particularly undergraduates contemplating a career in economics, with some idea of modern developments in pure and applied economics, and of calling attention to the scope available for challenging work in our science. With this latter view in mind it is our intention to solicit articles of an expository nature from experts working in these various fields of recent development. While the above statements will guide our policy, and will largely determine the contents of the Journal, they are not intended to be exclusive, and do not bind the editors. All articles of a serious nature on economic subjects are welcomed, and will receive careful consideration.

The editor wishes to express his appreciation to Messrs. Gary Fromm and Thomas Wilson of Harvard University for assistance in editing the manuscripts, to Mr. Enzo Allegretti of Fordham University, the former editor of this Journal, for helpful advice and assistance, to Mr. Alan Brown, the President-Emeritus of the Society for most valuable help in the technical preparation of the Journal, and to the many other members of the Society who generously responded when their assistance was requested. The editor would also like to place on record his indebtedness to Mrs. Sally Permut of the University Service Bureau at Harvard for most helpful and efficient technical and secretarial assistance, which in his opinion went far beyond the call of duty.

Nassau A. Adams

Editor-in-Chief

Economic Reasoning and Military Science**

T. C. Schelling*

Economists have been closely associated with problems of defense for at least two decades. World War II brought problems of taxation and debt management, price and wage controls, allocation of manpower and scarce materials, controls on investment and construction, large-scale contracting and renegotiation, readjustment benefits for veterans, import and export controls, and a host of other issues that kept large numbers of economists preoccupied, inside government and out. Many of these issues reappeared, on a smaller scale, with the Korean War. And currently a main preoccupation of the federal government, and of many economists outside government, is with the economic impact of our present defense program--questions of how much the nation can afford, whether arms control would have economic repercussions, how to divide the costs and risks of research between private industry and the military services, and so forth.

There are also problems of defense that are less obviously "economic." Scarce resources had to be allocated between the European and the Far Eastern theaters; between immediate military production and investment in future capacity; between being prepared for war in the short run and better prepared for military challenges later on; between our own military forces, military aid for allies, and economic aid to permit allies to increase their own military strength. Scarce resources have had to be allocated between increasing our available inventory of tested but obsolescing bombers and the missiles of the future, between the missiles that are most ready for production and those that, though not immediately available, can be available sooner or cheaper or in better quality a little later on if we invest more in their development now. We also indirectly allocate real income among members of the population by deciding what age groups and sexes will be subject to draft and what intellectual talents, training, and physical fitness will qualify or disqualify citizens for service. (This policy is not usually recognized as "economic," because the "income" gained or lost by undergoing the servitude, risk, family disruption, or physical and emotional discomforts of military service, are not commonly marketable, although there is occasionally recognition that different draftees have different "opportunity costs." Comparison with the Civil War, when one could contract out of military service by hiring his own replacement, reminds us that there has already been an economic-policy decision in treating the matter as though it did not involve economics.)

I am not going to discuss the first kind of economic problem, the one that might be called the "impact of defense on the economy." I am not going to discuss inflation, price controls, foreign trade controls, and the relation of economic stability, strength, or growth to military strength. I am going to omit these problems for two reasons. First, it seems unlikely--not out of the question, but unlikely--that we will go through anything like the sustained mobilization that we experienced in World War II, with the economy continuously in an emergency state over a long period of years. The pressing immediate problems appear to be more concerned with maintaining over an indefinite period a sizeable military budget, one that may strain the economy but nowhere near any breaking point and nowhere near a point where our economy, or our economic policies, become qualitatively and discontinuously different from what they are now.

My second reason is that most of these problems of stabilization and disinflation, of rationing and price control, subsidies and prohibitions on private investment, and so forth, are pretty familiar to economists and can be analyzed by methods and techniques customary in economics. It may be an interesting question what would happen to the economy if, through unilateral or bilaterally agreed arms reductions, our defense budget were rapidly reduced; but in a first approximation the problem is not greatly different from that of analyzing a sudden drop in private construction, farm investment, inventory accumulation, and consumer durables. The timing and the impact, and the political constraints on policy, would certainly be different; but we do not need a new branch of economics to analyze the inflationary consequences of defense budgets or their effect on economic efficiency and growth.

Economics in Military Decisions

What I want to talk about is the economics involved in military planning, military decisions, military investment, military resource allocation, and the selection of military objectives. I want to talk about them both from the point of view of military planners and operators, and from

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**Based on an address delivered at the Fifth Annual Convention of Omicron Chi Epsilon held at Harvard University, February 27, 1960.

the point of view of political decisions about how much to pay for how much security against what dangers, how to distribute the burdens, and how to design the bureaucratic structure within which the military services operate. With respect to the military decisions, I want to talk both about the economic reasoning involved in the conscious choices that have to be made--in designing weapons, investing in future strength, allocating resources among military techniques and objectives--and the problem of designing military institutions so that the right decisions get made.

Values and Criteria

In the latter connection it is important to keep in mind that, while the military services "produce" something of value, they suffer from two restraints that are usually not present for an ordinary business firm. One is that they may not get to test the correctness of some of their most important decisions until the unique occasion when it is too late to learn by experience. The second is that there is no "market test" analogous to an external price system that can eliminate the inefficient, provide incentives for cost savings and productivity increases, reward the successful, and permit incremental adjustments in policies of the kind that a manufacturer of cars or cake mixes can take advantage of. The military services not only lack a "market" to test the efficiency of their decisions, but they have no market to test even whether they are trying to achieve the right objectives--working with the right value system--and whether the appropriate "consumer sovereignty" is being served. If the Ford Motor Company produces its own tires, it can look around to see whether its tire manufacturing is competitive and can purchase its tires instead if it is not. General Motors can to some extent make Chevrolet compete with Pontiac. And the directors can always look at sales, prices, share of the market, and profits, to see whether they are generally on the right track. The military services, like many government services, lack these advantages.

Economics as the Science of Economizing

What I am getting ready to talk about is not so much "economics" as "economizing". It is the role of economic reasoning in military decision-making, in the design of military institutions, and in the choice among military strategies at the political level. A large part of economics is concerned with the science of economizing. In fact, even the more purely "social science" part of economics--the study of business behavior, consumer behavior, the behavior of labor, and so forth--is based on a theoretical analysis of how a businessman, consumer, or potential employee "should" react to the costs and values that confront him, in the interest of maximizing profits or welfare or real income. There is more to economics than the science of economic choice--of allocating versatile but scarce resources among competing objectives--but this is a large part of economics. And it is the part that in recent years has been finding more and more application in business consulting, operations research, and "applied welfare economics" like water-resource and highway development or the design of a salary structure at a university.

Economics is also concerned with "incentives." And designing a set of military procedures and institutions so that decentralized decisions made by far-flung base commanders, procurement authorities, weapon designers, and logistics specialists, will be "correct" decisions, under some kind of "invisible hand," is a genuine problem in economic organization.

Finally, we should remember that game theory itself was, at least in the monumental book that brought it into fashion (Von Neumann and Morgenstern's Theory of Games and Economic Behavior) closely allied--or believed to be closely allied--with economics. There is more than a semantic connection between price war and real war; and there is at least a touch of similarity between, say, a threat to retaliate with nuclear weapons and a threat to retaliate by calling a strike.

I hope I have by now given some indication that the connection between economic reasoning and even the purely military aspects of national security is a close one, and that economics has, at least in principle, something to contribute.

An Example: Design of an Aircraft

So let me begin to be specific. Let's look at some typical military choices to see in what sense they can be construed as "economic." We can look at problems at several different levels of detail. Consider first the traditional problem of designing a bomber. It is easy to say what it is that we like in an airplane; we like it to be cheap, fast, maneuverable, and reliable; capable of flying at very high altitudes, capable of flying at very low altitudes; not too visible to optical, radar, or infra-red sensory devices; predictable in its performance; not too fatiguing on the crew; not too demanding in its base requirements, maintenance requirements, and spare parts; capable of early production, capable of modification as new developments become a-

vailable; and, finally, capable of carrying a large "payload." Similarly, we know what I like as a consumer: I like good food, good schools, a warm house, a big house, an attractive house, good health, pleasant working conditions, leisure, economic security, independence, and a million other things. My economic problem is that I can have more of some of these only if I take less of others; I can have more money if I work harder, I can send my children to better schools if I take a job somewhere else, I can have a bigger house if I consume less liquor or cheaper food. The airplane design is also an economic problem; I can carry a bigger payload if I carry less fuel and take a reduction in operating range; I can fly higher if I carry less fuel and go a shorter distance; I can carry more bombs if I carry less electronic equipment; I can have more reliability if I demand less fancy gadgetry; I can get along with a less reliable plane if I'm willing to hire more maintenance personnel and keep a larger supply of spare parts; I can have more planes if I buy cheaper ones, and have my planes quicker if I accept less advanced models. Everything I like in an airplane comes at some opportunity cost.

In economic terminology, I have a "transformation" curve among two or more commodities, the commodities being characteristics of my airplane. More generally, I have a "production function" relating a variety of costly inputs --raw materials, investible funds, personnel, real estate, fuel, etc.--to a multi-product production process.

I also have a valuation problem. I cannot just draw the transformation curve corresponding to a given budget, and pick the point on it--that particular mix of range, speed, payload, maneuverability, etc.--that maximizes my achievement of my goals (maximizes "profits"). I have no market where I can sell range and speed at going prices (or against downward-sloping demand curves) and maximize profits like a businessman. I have to find some way of combining these characteristics of an airplane into a value system, or a set of criteria. I must draw up my "indifference curves" as among speed, range, payload, and so forth. I am not altogether different from the Robinson Crusoe who balances his consumer preferences against his production possibilities in reaching a decision on what to produce and consume.

One thing I am trying to demonstrate is that even a typical military design problem of this sort can be cast into the familiar language of economics: the economics of production, consumption, valuation, optimization, and choice. But I also want to argue that this is the way the problem has to be construed, to do a good job with it. It is not enough to say that I want the fastest airplane I can get, as long as it will carry at least 25,000 pounds of payload and fly at least 50,000 feet high; that would be like saying I want the prettiest house I can get that has nine rooms, a modern kitchen, and a good heating system. Typically no one of these characteristics is so dominant that we can subordinate all the others and simplify our choice to where it no longer looks like economics. We do have to balance payload against speed, speed against range, sophistication against reliability, and so on.

You may say that this is all true but trivial. Anybody can see that this is a simple economic problem; but that only proves that military officers, like businessmen, have always been doing economics without being aware of it. We have always assumed that businessmen did maximize profits; having a theory to account for how they do it helps us understand better what they do but puts us in no position to teach them how to do it or to do it for them.

I think that would underrate the achievement of economics. These problems are not so "obviously" economical in their structure that there is nothing further to be gained by putting it explicitly in terms familiar to someone who has had training in economics. Furthermore, viewing these choices and decisions as essentially economic problems often provides a more straightforward and less strained analytical approach; it provides a logical framework and a set of familiar concepts, even a terminology that should not be underrated. So I think it is not an altogether trivial accomplishment to cast the problem in economic terms.

An Example at a Higher Level: "Offense" and "Defense"

But let us go up one level. Consider defending the population in time of war. One way is to dig holes that we can get into when the bombs drop. Another is to shoot the planes when they come overhead before they can drop their bombs, or confuse them so that they miss their targets. A third is to go catch them on the ground before they've left enemy territory. A fourth (more relevant to World War II than to a likely future war) is to bomb the enemy factories that make the weapons he sends against us. And of course we can do a mixture of these things. Alternatively we can just sit still and suffer the losses he can inflict, if these losses would actually be less than the costs of doing those other things.

Some of these we might call "offensive," some "defensive." Some we might call "active," some "passive." Some we might call "civil defense," some "military action." In World War II the question arose whether it was better to defend convoys against submarines, to go after the subs on the open sea, to get them in their pens, to bomb the shipyards where they were being built, to build more ships of our own and produce more goods to offset losses due to submarines, or to fight the war in a way that required transporting less material overseas. These are essentially economic choices. They are economic in the sense that they are alternative ways (substitutes) for accomplishing much the same objectives. With limited resources one can do a little of all of them, or more of some and less of others; but they all compete with each other for limited resources. Similarly one can keep warm by insulating his house better, having a more efficient heating system, buying more fuel, wearing warmer clothes, having a smaller house with the same heating system, or moving to a warmer climate; he can also just get used to feeling colder if he'd rather stick to a large house and his present location and spend his money on other things than fuel and insulation.

Does this suggest that "offense" and "defense" are really the same, and that "civil defense" and military action are much the same? I think it does. Offense vs. defense, streetcars vs. automobiles vs. living in town, more fuel vs. more insulation vs. warmer clothes, are to a large extent economic alternatives.

Values and Criteria Again

But again we have to recognize that these are usually not alternative ways of achieving a single objective. Catching the enemy on the ground or shooting him after he gets here, defending against submarines or just building more ships, wearing warmer clothes or living in a smaller house, are in a very general sense alternative ways of winning the war, defending the population, or keeping warm but the "product mix" is different with different choices. We have to think about how we value economic loss vs. casualties, shortening the war vs. taking more casualties, easing the damage to ourselves vs. easing the damage to our allies, or perhaps improving the most likely outcome of the war vs. improving the worst lilely outcome of the war.

We are not simply maximizing profits, or maximizing anything in a single dimension. We need our indefference curves again; we need our explicit valuation scheme. We have not only production economics but consumer economics. We need criteria for choosing among different product mixes that differ from each other in that each compared with the other meets a little more of one objective and a little less of another, both being objectives that concern us enough to require an explicit balance. In the jargon, we must "optimize," not "maximize." We have to reach a proper balance, where the marginal gain in switching to an alternative mix is less than the marginal loss, taking all of the objectives into account.

Relevance of the Economist

If this sounds too obvious to be worth calling "economics" let me just say that in my experience it is not. It is peculiar to the training of an economist that he is continually aware of the need to optimize rather than just to maximize, of the need to weigh explicitly the value of more progress toward one objective at the expense of progress toward another. An economist, by his training, is suspicious of any analysis that singles out one conspicuous variable, some "dominant" feature, on which all attention is to be focused, and that is to be maximized by putting arbitrary limits on the other variables. It is also characteristic of an economist that he is aware of substitution possibilities, that he views alternative mixes of inputs as different ways of potentially achieving much the same thing, and that he is suspicious of any arbitrary specification of product characteristics as being the "right" ones. An economist is suspicious of any measure of efficiency that is a simple ratio of one output to one cost element; he is suspicious of any attempt to arrive at the "best" design of a weapon or program independent of the costs that go into it. He recognizes that while a Cadillac may be better than a jeep it is not necessarily better than two jeeps, depending on the purpose, and that it may cost as much as two jeeps, so that any choice between a better item and a worse item is likely to be also a choice between fewer and more.

He may, of course, have bad judgment. He may exaggerate substitution possibilities, or pretend that continuous variation of the product mix is possible when there is actually a limited number of combinations that can be achieved; he may make a nuisance of himself insisting that in principle one has to take all things into account when in fact many of them really don't matter. Nevertheless, the economist's way of construing these problems is an important one; it may not be the only way, but it is one that has a great deal to contribute. And the economist's way does not seem to come naturally to businessmen or military officers, particularly to military officers who are selected and trained for so many qualities, and have such varied experience, that they may have had little experience in formulating

these problems and little motive for reflecting on them. Customarily designs are specified, resources are allocated, product mixes are decided on, without explicit regard to relative costs; traditionally costs have been considered inappropriate at the level of deciding, say, on the table or organization and equipment for an armored division, or the allocation of funds between offensive and defensive forces, naval and air forces, military and civil defense, and so forth. This situation is changing; but I believe one reason it is changing is that more explicit economic reasoning is getting into the planning process, the design process, and even strategic thinking. And some of it is getting in through the efforts of professional economists.

It may sound as though I am saying nothing more than that operations research is a good thing, and that if we wish to we can call it applied economics. But I am trying to say more than that; instead of saying simply that military planning needs operations research, I am saying that operations research needs economics.*

The "Science" of Strategy

Let me go on to some problems that are more than operations research. Take the subject of "strategy." Strategy has traditionally been the science of conducting a war. But today's strategy is less concerned with how to conduct a war that has already begun than with using potential military force in the conduct of foreign affairs. "Deterrence" is a strategic concept, but not a purely military one. Certain military capabilities are necessary to deter aggression; but essentially deterrence is concerned with manipulating or working on or influencing a potential enemy's preferences, intentions, and understandings. Deterrence depends not only on what one can do in a purely military sense but on how one can display what he can do, and prove that he not only could do it but would do it; it depends on appealing to the enemy by knowing how he makes his decisions and what his values are, what his information is, and how he evaluates costs and risks and gains. And it is not concerned only with threats; but concerned with "promises" as well. To deter, one has not only to make credible to a potential enemy that he would be punished if he misbehaved, but also that he would not be punished if he behaved. One has to appear threatening, but only with respect to certain contingencies.

*For an excellent discussion of this subject see Charles J. Hitch, "Economics and Military Operations Research," Review of Economics and Statistics, XL:199-209 (August 1958).

Or consider limited war. Limited war is essentially a bargaining process in which violence and the threat of violence is used, in which one tries to coerce or to deter an emeny and cause him not to pursue all of the actions of which he is currently militarily capable. Or consider arms control; arms control is concerned with the kinds of arrangements that can be made between parties that dislike and distrust each other, in their mutual interest.

The theoretical side of this subject is really game theory--or would have been if game theory had made progress in these directions. In truth this field does not belong to anybody. It is not part of traditional military science; and I think it is obvious that it takes more than military skills to use a combination of threats and promises in dealing with enemies, allies, and neutrals. You can call it political science if you wish, but in some respects it is closer to economics. Duopoly, bilateral monopoly, collective bargaining, antitrust enforcement, partnership agreements, price wars and truces, market-sharing arrangements, and even ordinary commercial bargaining, contain elements of strategy that are not wholly dissimilar to international strategy. Perhaps if we had paid more attention to the economics of blackmail and extortion, of racketeering, of burglary and criminal deterrence, and if we had treated the more violent side of industrial relations as a central part of economics, we'd be better prepared for handling these problems.

But even in conventional economics there are analogies for problems like surprise attack and arms control. When one looks at discipline in a cartel arrangement or an international commodity agreement, or at the tacit (and sometimes explicit) agreements that limit competition to non-price behavior, or looks at the understandings among automobile companies about restraining their introduction of new accessories, one sees something analogous to the problem of surprise attack and arms control. The key feature of most of these arrangements is that everybody has some interest in jointly abstaining from certain kinds of conflict or competition, but everybody is subject to a powerful temptation, in the event somebody breaks the agreement, to get in first; and everybody is somewhat suspicious that everybody else is contemplating precisely that. The first company to introduce new fuel-saving carburator gains a one-year advantage over its rivals; the first country to break a coffee agreement and dump its surplus on the market gains a once-for-all advantage; the partner who absconds with the funds, or the country that launches preventive war, may all wish that

there had been an absolutely foolproof system of contract enforcement so that they could continue to enjoy the benefits of mutual restraint, but be unable to find an institutional arrangement that would tie everybody's hands so securely that nobody would bolt or fear anybody else's bolting.

This is a fascinating subject, one to which economists have contributed as much, I think, as anybody else; one that does not yet belong to anyone, certainly not to the military services; one that could use some theoretical development. It is also, I would add, one in which there is a very interested audience; my impression is that contributions are welcome, not resented. Lawyers dealing with criminals, parents dealing with children, price leaders dealing with small companies, unions dealing with management, and the United States dealing with the Soiet Union, are all coping with the elusive problem of deterrence, of coercing an opponent or a partner by working on his expectations of how oneself will react; and in my judgment none of these has yet mastered the subject and developed such satisfactory theory that we need to consider the field conquered or even well-explored.

An Example: The "Arms Race"

A good example is the phenomenon known as the "arms race." What most people seem to have in mind, in speaking of an arms race, is a situation in which two or more adversaries or competitors are so motivated, in the building of their military establishments, that a main determinant of each one's decisions is the level of armaments that the other has built or is building. Each side is concerned about its relative arms position vis-a-vis the other. But for each side arms are expensive. Each tries, subject to a budgetary constraint, to achieve a level of armament that bears some "normal" or "safe" or "desirable" relation to the other side's. The arms race is thus a dynamic process of adjustment, in which each side reacts to what the other is doing.

Notice the analogy to, say, duopoly behavior or "duopolistic competition," in which a pair of competitors with differentiated products attempt to set their individual prices, or decide on their outputs, with a view to each other's price or level of output. Each wants its price to be appropriate relative to that of the other, not too high or it will lose business to the other, not too low or it may lose profits by competing excessively. Price competition may be costly for both of them, in the sense that as they lower their prices ("price war") they may both lose revenue and profits. If we imagine each of them setting his price with an eye to the price the other is charging, and if we make the rather artificial assumption that they change their prices by small increments, watching each other in the process, we have something structurally analogous to an arms race. In the duopolistic competition, each wants to have a price low enough, but not too low, relative to the other's price; but it is costly for both parties to lower their prices together. In the arms race each wants his armaments to be high enough, but not too high (because they cost too much) relative to the other; but if they both raise their armaments together the result is costly.

I don't want to press the analogy too far, since it is evidently not a terribly close one. What I want to point out is that there is at least some analogy between the abstract models that we might build to analyze the two processes; or, if the analogy is not close enough to deserve emphasis, there is at least a similarity in the <u>analytical techniques</u> that the two processes call for, in the concepts they may draw on, and in the talents that may be needed. One is economic and the other is military; but while the contents of the two problems are dissimilar, the structures and the processes are not. A general theory of competitive and cooperative adjustments of two partners or adversaries, of the interaction between two behavioral units or decision centers that affect each other and that can observe each other, would not have to be very broad and general to encompass both of these phenomena. And while the two are quite different as special cases, they are species of the same genus. We could undoubtedly pick other examples involving, say, the political platforms of two candidates competing for election, two cars competing to be first in an intersection, or two students competing for highest honors on their theses, examples that in their <u>contents</u> would seem to fall within political science, traffic management, and gamesmanship, but that <u>analytically</u> are within the general subject that we might call the analysis of <u>interdependent decisions</u>.

My point is that many problems of military strategy are analytically not remote from the problems economists deal with, and that economists may find them rewarding to work on. If these strategic problems were already being mastered with subtlety and skill by a vigorous and well-organized profession, it might be unnecessary and unbecoming for economists to intrude. But that is not the case.

Social Choice

Let me turn to another area in which the economic reasoning is essential. Consider civil

defense. Protection against radioactive fallout could make a difference in casualties in the event of war. For our present purpose let's not worry about just how much difference it would make, and what it would cost. (Notice that it depends a good deal on how the war is conducted, who starts it, how it is terminated, and who the enemies are.) Consider the question whether civil defense makes sense; if so, how much, and what kind, and for what parts of the population.

Here is a problem of social choice, not wholly different from that of allocating tax resources into police protection, better schools, slum clearance, or public health. There is an important difference, though, in that we are dealing with points way out on the extremes of our value scales, way out beyond the normal region in which we make choices. These are life and death questions, of the kind that the ordinary consumer rarely makes or, at least, is rarely conscious of. We make it when the doctor tells us that our eyesight may be restored by an operation that has some probability of being fatal; we have it to a much lesser extent when we make these fateful economic choices about what profession to enter or whether to tie ourselves down with children and the expenses that go with them. (We might have them at the forefront of economics if economics had not, for the past century, in contrast to the century that preceded it, shied away from population problems.)

In a way this is a simple problem. We estimate what the casualties would be in a war without prior civil defense arrangements, and what they would be if we did have a civil defense budget to spend. We attach some kind of "utility" or valuation to the difference it makes, multiply that by the probability of war, and compare it with the utility we give up by spending money on civil defense. In principle this is an ordinary economic decision; but it is an extraordinarily hard decision to make. Notice that we have to find some way of estimating the likelihood of war. (We must even estimate the relative likelihoods of different kinds of wars.) And we must find some way, deep in our souls, of deciding what it is really worth to be alive in a hostile environment rather than dead, or to be alive with our children rather than leave them as orphans, or to have other Americans alive with us (or without us). This is a real test of whether our economic decision models are at all realistic in assuming that consumers know how to value--in the sense of imputing utility to--the alternative outcomes or commodity mixes with which they are confronted, particularly when great uncertainty attaches to the outcome. Is there really a "rational" way of deciding how much better it is to be alive and in great pain rather than dead, alive and lame rather than dead, alive at the Brazilian rather than the Chinese level of income, or alive to meet family responsibilities rather than dead in the event some of the children live? Can people really cope with the problem of deciding whether the likelihood of general war is 75%, 25%, 5%, 1%, or less? And can people collectively use this knowledge and these feelings in reaching a political decision for the nation?

Some people answer this question by saying they'd rather be dead if war occurs and don't want to spend money or degrade themselves by thinking about how to preserve the possibility of a fate worse than death. They probably evade the issue. It is not clear that they really would rather be dead when the time comes; nor does it appear that many of them have taken ordinary precautions to die painlessly. (The price people pay for anesthesia in an operation, or to stay warm in the winter, suggests that unless they've arranged to be sure they're dead they may not have faced up to what the choice is all about.) Furthermore, people who face great pain and privation and low living standards, like, say, the Pilgrims who landed off our coast a few hundred years ago, have typically not preferred quiet suicide; and their choice does not seem entirely explained by an irrational inability to make an end of things.

I think the situation is that we generally do not, either as economists or as consumers and voters, make choices so far out on the extreme end of our value scale. We seldom have to. When we do we find it intellectually difficult and emotionally painful. In fact we may find it so painful that, somewhat irrationally, we refuse to face the choice (and thus make a choice by default).

What I want to suggest to you is that here is a fascinating field of study for an economist, a study of consumer choice when the alternatives are very, very distant from each other along the value scale, and when the uncertainties are of a most elusive kind. Whether you study how people and political bodies actually do face (or refuse to face) these choices, or how they ought to make these choices, it is a challenging study intellectually and one of the greatest social importance.

Take another case, peacetime fallout. There is some controversy about the <u>facts</u> of peacetime fallout, but not much compared with the controversy over how we should attach a <u>value</u> to the damage it may cause. Should we look at some millions of deaths or disabilities and become appalled at how large the absolute number is, or look at it in proportion to the world's population

(and the cumulative total of future generations through some stretch of time) and remark on how minute it is. Do we say that 10,000 cases of leukemia in children are an appalling tragedy, or that it is small compared with death by malaria? How do we value inflictions on future generations compared with inflictions on ourselves?

I am not proposing that all we need here is a materialist economic calculation. But I do want to suggest two things. First, evaluations of this sort do contain an important, even an essential, element of economic reasoning, or at least the kind of reasoning that comes more readily to economists than to many other professional groups. It is relevant, for example, to ask what it would cost to save lives and to reduce suffering in an amount statistically equivalent to the human damage that would be done by peacetime fallout. At any time we have available a variety of ways to save lives and to reduce suffering; we know them or can find out about them and estimate their effectiveness. We can install traffic lights, improve public health, provide better medical service, improve diets, provide better storm warning, educate people, produce safer cars, and do a variety of things that will reduce accidental death, death by disease, infant mortality, and so forth. We can presumably even analyze these ways of saving lives in terms of their geographical distribution, their age and sex distribution, their distribution among the strong and the weak, among the rich and the poor, and so forth. Don't we get some measure here of the possible significance of any policy or phenomenon that causes pain, death, disability, or some other form of tragedy?

I am not saying that we get a good measure, or the only measure. I am just saying that we at least get a benchmark. We can find some way of translating what seems to be infinite or incommensurable or elusive into something measurable, familiar, and translatable into our experience and our policy decisions. Maybe we discover in the process that we have been applying wrong evaluations in our decisions about accident prevention and public health. Maybe we discover that, with a wide margin for error, we can attach some lower and upper limits to the valuation we ought to put on a potentially tragic phenomenon.

The second thing I want to emphasize is that we can also, looking at it in terms of our own professional interests, find our way into some problems that economists have perhaps given too little attention to. There is an interesting difference between the way people respond to a slight statistical increase in the number of deaths expected during the next twelve months, and the way they respond to the imminent death of a particular person. Let the newspapers announce that a little girl will die unless she can undergo a $40,000 operation, and nickels and dimes will pour in. Let it be said that improvements in hospital facilities throughout the state of Massachusetts, costing approximately $40,000, would probably save the life of one little girl in the course of the next twelve months, and no movement for immediate tax increases will take place.

Similarly, there is a difference between letting somebody die by failing to spend money and causing his death to save money. There is a difference between people's response to death resulting from acts of God, especially those that are statistical in character, and those that result directly from government policy. There is also some sheer social pain and cost in <u>contemplating</u> tragedy, and being obsessed with it; a lot of people who know that airplanes are pretty safe don't ride them because the sheer awareness of accidents is too vividly in their minds whenever they get on board; but the greater likelihood that they'll be killed by a car as they walk down the street is one they can live with because it does not play on their minds.

In other words, the value system we want to study may be a subtle and complex one, with components that at first glance appear irrational. These are so central to the process of social valuation that an economist would be fooling himself and everybody else by leaving them out of his analysis. I am suggesting that we bring them into our analysis. There are many aspects of social evaluation that, through negligence or tradition, we leave out of our policy analysis; an advantage of jumping directly into problems of war and peace, death and destruction, pain and servitude, and the discriminatory distribution of death among the population, is that we cannot ignore these seemingly intangible and incommensurable valuations.

The Design of Military Institutions

A final topic (without nearly exhausting the subject) is that of designing institutions and procedures for the military establishment that are conducive to efficiency in the allocation of resources, in the design of military systems, in the strategic choices that are made. There are at least four different areas of study here.

Decentralized Decisions

First is designing procedures so that efficient <u>decentralized decisions</u> can be made. As

I mentioned at the beginning of this paper, the military establishment -- though it is as big in the resources it disposes of as the entire economies of certain countries -- is for the most part a "firm" rather than a "competitive economy." It is a single institution with a chain of command and a planning process of a centralized and hierarchical sort, not a set of atomistic units acting independently and competitively. A wing of B-52's, or a squadron of submarines, or an infantry division, is not an independent unit competing for business, serving objectives of its own. It is subordinate to the whole organization; it consciously fits into the scheme of things, and has its basic objectives laid down from above. But an organization consisting of millions of people and tens of billion-dollars a year can no more be planned in meticulous detail than a whole economy. There must be some procedures or devices or incentives or regulations that permit decisions to be made from day to day and from year to year, little decisions and big decisions, that are not handed down from the peak of the pyramid, but that somehow get made correctly.

Somebody has to decide whether to discard a worn-out piece of equipment or to repair it, whether a little more target practice is worth the expenditure of ammunition and the opportunity cost of some other kind of training, whether maintenance procedures for vehicles or aircraft should be adapted to local vagaries of climate, whether to add anti-aircraft equipment to the deck of a ship that will take up space and weight and maintenance personnel that might have gone into some other kind of equipment. Somebody has to decide whether to buy new equipment for a military aid program, to give reconditioned equipment to the ally and replace it with new equipment for the American forces, or to give equipment to the ally out of surplus stocks of obsolescent equipment. Someone has to decide whether to put $50 million into the development of a weapon that is similar to a weapon that another service is already putting $50 million into. Someone has to decide whether to work his highly specialized personnel as hard as they can be made to, in the interest of maximum current effectiveness, or to make life a little pleasanter for them so that they won't resign at the end of their enlistment period taking with them the expensive skills that the military service invested in.

These problems are not terribly different from those that occur within an ordinary business firm. But it comes naturally to a business firm to think in terms of costs; and most of the things that a business firm deals with can, one way or another, have a cost estimated. Military and civilian decision-makers in a military establishment are less inclined to think of themselves as engaged in a cost-reducing, money-saving, profit-maximizing business; so there is a problem to begin with in creating an appropriate cost consciousness.

Information and Incentives

But, more than that, there is a need to provide knowledge of costs to someone who is disposed to reduce them. When the matter at hand involves saving of some gallons of fuel, or some spare parts in a catalog, or some civilian typists, it may not be difficult to guess or to find out how to value the savings involved. When the matter involves using privates to repair buildings on an army base, to use skilled personnel to do unskilled jobs, to increase this year's combat readiness at the expense of next year's, or to increast anti-aircraft defenses at the expense of anti-submarine defenses, it takes special arrangements to permit someone who is willing to make an economical judgment to know how to do it correctly. Thus one of the problems in designing an efficient military establishment, over and above creating some "cost consciousness" on the part of those who dispose of costly resources, is to give them the criteria they need, and the information they need, to make intelligent decisions.

Another is to give them an incentive. The commander of an airbase certainly does not lack incentive; his incentive is mainly oriented toward the condition and effectiveness of the base he commands, the combat effectiveness of his equipment and crews, morale and discipline, and the other "positive" values that he promotes. He may be vaguely conscious of the tax payer, because of the various "watchdogs" that the tax payer sets against him. He may have some sense of obligation to, or collaboration with, other commands in the same service, but nevertheless may feel that if he can acquire a scarce item that might have gone to some other airbase he should feel proud rather than guilty. Strong motivation to duty requires an attitude of exaggerated preoccupation with one's own command. A base commander who knows that he is being allowed to consume resources that cost the service more than they are worth to him may be reluctant, perhaps pardonably, for not voluntarily relinquishing the windfall. Every agency of the government, and every department of a university, knows that if it reports through budgetary channels that it is currently being allowed to spend money on some low priority things, it will not be told, "Thank you, spend the money

better." It will be told, "Thank you, we'll cut your budget accordingly." Part of the incentive problem is to make it possible for someone who can save resources to use them (or part of them) in meeting his own goals.

Across-the-Board Prices

Another level at which the framework for decision needs to facilitate efficient decisions is in the setting of across-the-board prices, costs, and specifications. A good example is military pay. Other things equal, it might be efficient to let local commanders bid high prices for the particular specialized personnel they need, setting whatever wage differentials for military and civilian employees that they have to set to get an economical mix. Other things usually are not equal; it may be intolerable in over-all personnel policy to have the wage differential between corporals and privates, or between mechanics and radar operators, differ from base to base. But there does need to be a wage policy, and some attention given to wage differentials. It is remarkable how little attention economists have given to wage policy and employee relations within the military services themselves. Yet where else in the economy would an industry of comparable size be as likely to require careful economic reasoning as in the military services, since it is precisely here that rules of thumb, imitation, union action, and competitive market forces, are weak enough or irrelevant enough to leave a wide range for conscious decisions.

Planning and Budgeting

A third area is in the planning and budgetary process. As remarked earlier, the choice among weapons, the proper "mix" of weapons, and the design of weapons, requires attention both to money costs and to "opportunity costs"; a "best" piece of equipment or method of operation cannot be determined without regard to costs and alternatives. The same is true at the highest level of budgetary allocation, whether it be the allocation of resources between strategic air command and air defense, or between the Air Force and the Navy. The "decentralized" decisions in the preceding paragraphs are essentially concerned with the proper use of resources that have been made available, through political and administrative processes, to those who expend them. We are now talking about the parallel problem of making similarly efficient choices and decisions in the process of planning the military establishment and its expenditure of resources, the planning usually taking place in the course of a budget cycle.

Contact with the Civilian Market

Finally, there is the important area of contact between the military services and civilian industry. More than half of the defense budget goes for procurement of equipment or materials, or hiring of services. The defense establishment is essentially a huge, but not necessarily potent, monopsonist, facing industries that range from fairly competitive to extremely oligopolistic. The military services are furthermore in the business of consciously generating their own future demands, in contrast to the ordinary consumer who rarely negotiates consciously with a manufacturer about the kinds of products he would like to see available several years from now. So there are interesting problems of how uncertainty is shared between the buyer and the seller (not altogether unlike the problem of a consumer who contracts with an architect or contractor to have a house built). The contractual relation between the military services and their suppliers is an important and fascinating field of study.

It is particularly fascinating because it raises the question of where the line should be drawn between private industry and the military services. On the whole we do not have the "arsenal" concept; defense industry is not nationalized; weapons are built for the most part by private business firms. (The Navy has some shipyards, but the Air Force owns no missile factories.) Even much of the training of military personnel is done by private business on contract.

Strategic Thinking on Contract

It is even true that a great deal of strategic thinking is now done for the military services on contract. This is not a matter of conscious policy, but rather reflects the fact that strategic thinking and the design of weapons are closely interrelated processes; the firm that builds a missile or a propulsion system with some new characteristics is likely to do a great deal of the thinking about how those qualities relate to strategic objectives and contingencies. New strategic ideas are likely to be developed by a manufacturer who has a new product and is thinking about how to justify it or rationalize it or sell it to a military service. Furthermore, private business can hire people outside the bureaucratic personnel system, and keep them as full-time specialists on strategic problems, while the military services have usually been committed to the notion that their officers should rotate in a wide variety of jobs and not become specialists. So it is natural, even if not a matter

of conscious design, that strategic thinking as well as manufacturing should be contracted out to private industry rather than nationalized in shipyards and arsenals.

The Line Between the Military and the Civilian Sector

And here there arise even such questions as what the purpose of a military establishment is at all. Why are missile bases manned by Air Force officers rather than civilian technicians and engineers? I raise the question not because present policy is wrong but because it is a fascinating question of economic organization. There is something about military organization that transcends ordinary commercial relationships. Some commitments cannot be bought, and can be obtained only through emotional bonds and ties of the kind suggested by terms like "loyalty," "duty," "honor." It is possible to make a strong case for the existence of military services, outside ordinary civil service procedures, and to treat the crew of a bomber as different from the employees of a post office. But it can be instructive to analyze precisely what the difference is.

And it can also be an important practical matter to think about where the line ought to be drawn, because the modern military era is one in which tradition is by no means a sure guide. Just as in the design and manufacture of weapons, and in the development of strategic thinking, and in the training of military personnel, there has been a shifting line between what is military and what is private, so there may also be (and in fact is) a line between military service and civilian personnel in the operation of military equipment and the performance of "military" service. The line is subject to change, to uncertainty, to new decisions, and deserves to be an important matter of policy.

The military services are not unique in this. The medical profession, the local fire department, university faculties, and many commercial and private organizations face similar problems on their own scale. (How does one keep a night watchman from resigning on the particular night that he hears a suspicious noise and faces danger for the first time?) Here is another case in which attention to military problems requires one to face some of these extraordinary, non-traditional, somewhat unconventional problems of economics. In other parts of the economy they may, whatever their importance, be considered "peripheral," and evaded; in military economics they cannot. And a by-product of paying more attention to military economics may be that we discover, with great force and clarity, interesting and important problems that we have heretofore overlooked.

* * *

I have by no means covered the field encompassed by the title of this talk. But my purpose is not to survey the entire field; nor could I do so if I wished to, since it will require a great deal more imagination before the field can even be discerned in its full detail. My purpose is only to show that there are some fascinating and intellectually challenging problems of military design and decision-making, of a sort that should particularly appeal to economists, and on which an economist can make a genuine contribution. To some extent this is just saying that military problems, though military, are also essentially "economic," and that the reasoning we apply to agricultural economics, labor economics, or business economics, can also be applied to military problems. That is true, and important. But I have also tried to show that there are some problems peculiar to the military field, or at least that appear with especial clarity and emphasis in the military field, that are novel and challenging. Not only can the economist apply what he already knows to military problems, but he can find unsolved problems of a kind that he is peculiarly fitted to work on, or at least as well fitted as anybody else and that, in any case, are not being adequately worked on and have not yet been claimed as the domain of any other science.

DYNAMICS OF SPATIAL COMPETITION

Alan A. Brown*

Introduction

The basic conclusion of this paper is that in a wide variety of competitive situations, where entry is unrestricted, and the rivals find it relatively free to adjust their location or the quality of their product -- according to some quantitative scale -- in order to maximize their profits, a constant influx of newcomers is encouraged. The newcomers can always find a position, or quality of the product, which will give them a profit equal to that of the most prosperous of the existing firms. Since every new entry reduces the profit of all existing firms, a point is inevitably reached after which some of the older firms can make only submarginal profits. These older firms -- unless they can restrict entry -- would be forced out of the particular market under consideration. Generally, their exit would be gradual. In order to protect their fixed capital investment, they would find it advantageous to diversify their production. While still continuing to hold on to their diminished market share, they would begin to produce, or sell, other products, too. This theoretical conclusion is confirmed by the empirical observation that multi-product firms have proliferated in those industries where entry is relatively unobstructed and competitive adjustments are not too costly.

Paradoxically, in cases where the number of rivals is small, and where the producers or sellers do consider the indirect effects of their decisions (i.e., mutual dependence is recognized), the final outcome will be hastened. In this case, the adjustment will not come about in small steps; instead, they will tend to shift to their equilibrium positions at once.

The welfare implications of the outcome are not unequivocal. On the one hand, the increased turnover of producers or sellers will make the introduction of modern methods and technology more flexible. Underutilization of capacity will be alleviated by means of diversification. Diversification will also diminish uncertainty.

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On the debit side we have the cost of frequent adjustments and the increased cost involved in foregoing economies of large scale production. We must, however, bear in mind that if these added costs are great, the indicated process of adjustment will not fully materialize. The high cost of locational or qualitative adjustments or the increased production cost, caused by a diminished scale, will act as a brake on further rearrangements by the existing firms, and thus the influx of new firms will be slowed.

The Problem

The problem of spatial competition was introduced by Hotelling in his pioneering article in 1929.(1) The problem of spatial location is a subcase of the broader problem of product differentiation. "Movement in space," in the broader sense, represents the adjustments in quality of a product which may be in one dimension (such as, increasing or decreasing the sweetness of apple cider) or in many dimensions, simultaneously. As Professor Chamberlin pointed out, conventional economic theorists, by limiting their attention to a given product, assumed away a most important aspect of business competition.(2)

Hotelling, by means of unnecessarily rigid assumptions -- completely inelastic distance elasticity of demand and the competitors' disregard of their mutual dependence -- arrived at the conclusion that the sellers will cluster at a central position. He applied the conclusion to a variety of fields, outside of economics, as for example, to the similarity of the Democratic and Republican platforms.

Lerner and Singer (3) reexamined the problem for more than two sellers and demonstrated that the arrival of the third seller will break up the clustering. A further refinement was introduced by Professor Smithies (4) by taking freight

(1) H. Hotelling, "Stability in Competition," Economic Journal, XXXIX (March, 1929), 41-57.

(2) E. H. Chamberlin, The Theory of Monopolistic Competition (Seventh ed.; Cambridge, Mass.: Harvard University Press, 1956), pp. 71 ff.

(3) A. P. Lerner and H. W. Singer, "Some notes on Duopoly and Spatial Competition," Journal of Political Economy, XLV (April, 1932), 145-186.

(4) A. Smithies, "Optimum Location in Spatial Competition," Journal of Political Economy, XLIX (June, 1941), 423-439.

cost into consideration. Professor Smithies also dropped the assumption of inelastic demand; however, he only dealt with two sellers; therefore, his conclusions were, in a sense, more restricted than those of Lerner and Singer.

Assumptions and Method

In this paper, we will drop several of the restricting assumptions. The conclusions will be extended to more than two sellers, the rigid inelasticity of demand will be removed, and the conclusions will take into account the recognition of mutual dependence by the sellers. We will modify our conclusions by taking the cost of adjustments into consideration.

To simplify our analysis, some of the assumptions employed by earlier writers will be retained:

1. The market is explicitly assumed to be one-dimensional or -- in a broader sense -- only one qualitative aspect of the product is changed at a time. (Of course, multi-dimensional variations of the product may be explicitly introduced into the model.)

2. The linear market is bounded on both sides. This assumption is not restrictive because, by varying the slope of the demand curves, we can vary the boundaries, i.e., the points where demand for the product becomes negligible.

3. A single price will be assumed throughout the market. Professor Smithies has demonstrated how price variations can be taken into account. Introducing price competition would greatly complicate the mathematical derivations without substantially affecting the final conclusions.

4. In the first instance, the demand curve is assumed to be linear but the results are extended to demand curves which are nonlinear to include any monotonically decreasing nonlinear demand curve in a single dimensional market.

* * *

The results are shown both diagrammatically and mathematically. To show the exact equilibrium positions obtained, or the absence of equilibrium, the mathematical proofs are essential but, in addition, for visual clarity, a box diagram is employed. The horizontal axis of the diagram represents distance, measured from the seller; the vertical axis shows the amount of sales at any particular point; and the area under the (demand) curve depicts the sum total of the demand for the product by all buyers.

Position of One Seller

As long as the demand for a product is functionally related to distance, the position of one seller is uniquely determined. He is going to locate in the center of the line. Only with perfectly inelastic demand and no transportation cost will he locate anywhere without reducing his sales.(5)

Position of Two Sellers

ENTRY OF THE SECOND SELLER-- When the second seller appears, he will try to find a location where his total sales will be greatest. Depending on the slope of the demand curve he will choose a position right next to his competitor or at a determinate distance away from the competitor towards the end.

On diagram 1, area SAZRQ shows the total profits of seller B (second seller). B will vary T to maximize his total profits. For the time being we assume A (first seller) to remain fixed at O.

We can graphically show B's gain and loss if, after settling next to A, he moves in an attempt to maximize profits. If he located next to A, his profit area would be OAHP. By moving a distance T, his loss would be VAHW, and his gain would be equivalent to SXRQ.(6) He will decide to move if, and only if, his gain, SXRQ, exceeds his loss, VAHW.

The formula for B's optimum distance from the center is: (7)

1. $T_{B1} = \frac{2a}{5}\,(1-h/m)$ Defined for $-1/2 = h/m = 1$

T_{B1} = The optimum distance from the center where B will locate to maximize profits (if A remains in the center).

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(5) Lerner and Singer (loc. cit., p. 177) gratuitously assume central location for one producer; although their assumptions are perfectly inelastic demand and no variations in supply cost, e.g., transportation.

(6) The proof is as follows: Compare the profit area after moving a distance T (SAZRQ), with the profit area when locating next to A (OAHP). Break up SAZRQ into two parts, XAZR and SXRQ. XAZR is equal to OAHP minus VAHW. VAHW is the gross loss, while SXRQ represents the gain in sales.

(7) For derivation see Appendix, I.

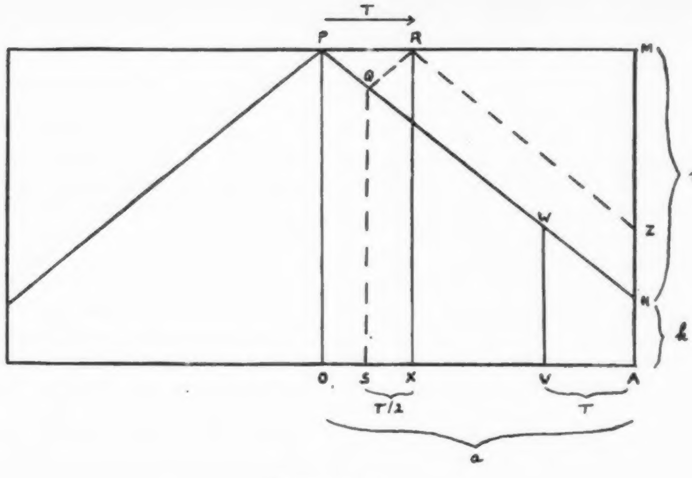

Diagram 1

h = The amount that a seller located at O would sell at the market boundary (AM), as shown by the intercept of the demand curve (PH) on the market boundary. (The market is provisionally assumed to be bounded. As it will be shown, the actual size of the market, controlled by one seller, is a function of both the number and location of his competitors.) If the demand is very elastic, i.e., the distance demand curve very steep, the sales will rapidly approach zero as we move away from the seller, located at O. If demand reaches zero before the end of the market, then, algebraically, h would be negative, (of course, sales would not be negative but they would become negligible before the market boundary is reached), its magnitude being downward from the x-axis along the market boundary to the point where the demand curve would intersect it. (This is shown on diagram 2.)

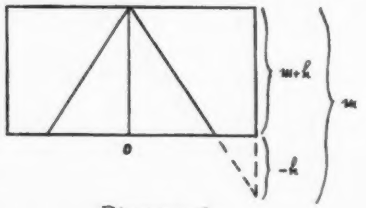

Diagram 2

m = quantity of marginal sales lost by the seller, located at O. (Like h, the loss is measured at the market boundary.)

h/m = marginal sales-loss ratio.

The upper limit (h/m = 1) shows that whenever the marginal sales-loss ratio reaches a certain limit (the amount sold at the end of the market is half of what can be sold where the seller is located), T_{B1} will be equal to zero, i.e., seller B will locate right next to seller A. (See diagram 3.) That is to say, he would lose more by moving away from his competitor than he would gain. We can see by inspection that he would stay in the center a fortiori if the demand curve is less steep than that shown in diagram 3 (i.e., if the distance-demand curve intersects AM above the midpoint of AM).

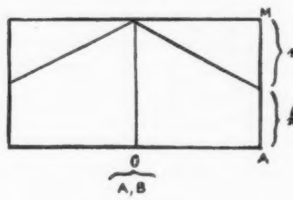

Diagram 3

The lower limit is set at h/m = 1/2 because a demand curve which is steeper than h/m = = 1/2 fails to provide a determinate solution. (For further elaboration, see section on Mutual Adjustment, below.)

MUTUAL ADJUSTMENT-- After the entry of B, seller A will find that he can increase his post-entry total profits by moving away in the opposite direction (unless marginal sales-loss ratio is such that the best location for B is right next to A, in which case A also would find it best to remain in the center).

The formula for A's best position is: (8)

2. $T_{A1} = \frac{1}{5}[2a(1-h/m) - T_{B1}]$

T_{A1} = The distance from the origin where A will locate to maximize his total sales.

T_{B1} = B's optimum location from the center (in the opposite direction from A).

This means that, T_{B1} being greater than zero, T_{A2} (A's second movement) will be less than T_{B1}.

When A moves away from the center, B will find it advantageous to come a little closer to the center. His new location is given by equation 2, with interchanged subscripts:

3. $T_{B2} = \frac{1}{5}[2a\,(1-h/m)-T_{A1}]$

As they keep responding to each other's moves, they will take smaller and smaller steps towards the center. Their steps form a rapidly converging geometric series. Their final position is given by: (9)

4. $F = \pm\frac{a}{3}\,(1-h/m)$

Since the function is defined only if $-1/2 \leq h/m \leq 1$, this means that $a/2 \leq F \leq 0$.

When $h/m = 1$, the final adjustment point will still be at the center. If $h/m = 1/2$, then the final adjustment point will be at the quartile point of the line. With $h/m = -1/2$, a centrally located seller's demand becomes negligible at the quartile point. Both sellers, by relocating at the quartile points, will not interfere with each others' sales. Any other location would mean less than optimum amount of sales. The solution is clearly undefined for $h/m < -1/2$ because a steeper demand curve would not give a determinate solution.

To summarize, the solution for two producers falls into three categories:

(a) High marginal sales-loss ratio ($h/m \geq 1$) -- best position in the center.

(b) Low marginal sales-loss ratio ($h/m < -1/2$) -- no unique solution.

(c) Moderate marginal sales-loss ratio ($-1/2 \leq h/m < 1$) -- uniquely determined solution, ranging from a location on the quartile points to a location at the center.

MUTUAL DEPENDENCE RECOGNIZED -- If mutual dependence is recognized, seller B will immediately settle at the final equilibrium point, and A can do no better than do the same on his side of the market. This would eliminate the cost of the step-by-step adjustment.

If mutual dependence is not recognized, settlement would have to occur in an infinite number of ever-decreasing adjustments. Considering the cost of moving, we have to realize that they will stop short of the final adjustment. Namely, they will stop moving when the gain from the increased sales is less than the cost of moving.

COST OF MOVING -- The cost of transportation or, generally, the cost of adjustment will change the position of the final equilibrium. Actual equilibrium will be at the point where any further gain, from an adjustment, is just offset by the moving cost. However, the frictionless equilibrium position will be approximated unless the cost of moving is very large. (10)

NONLINEAR DEMAND CURVES -- The argument remains essentially the same for any monotonically decreasing demand curve. With simple calculus we can show that, after A settles in the center, B will take up a position, between a location right next to A and the quartile point, depending on the demand curve. B will locate right next to A if the demand -- whether demand is a linear or nonlinear function -- becomes half of its original magnitude at the end of the market. (Marginal sales-loss ratio equal to unity.) If A's demand, before B's entry, becomes negligible at the quartile points, then, after B's entry, they will both move to the quartiles. (11) The formula for the optimum location of a newly entering seller is:

5. $f\,(a-T) = \frac{1}{2}f\,(T/2$

f ( ) = any monotonically decreasing function.

T = optimum distance from the center of the market.

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(8) For derivation, see Appendix, II.

(9) Using the recursion formula for A, $T_{An} = \frac{1}{5}[2a(1-h/m)-T_{Bn}]$ and for B, $T_{Bn} = \frac{1}{5}[2a\,(1-h/m) - T_{An-1}]$, we have $F = 2a(1-h/m)[1/5-(1/5)^2 + (1/5)^3-(1/5)^4 \ldots] = 2a(1-h/m)(1/6)$
$F = \frac{a}{3}(1-h/m)$

(10) The terms of the series $1/5 - (1/5)^2 + (1/5)^3 - (1/5)^4 \ldots$ rapidly approach zero. (Cf. note 9.)

(11) For mathematical derivation, see Appendix, III.

If demand is between the two limits, the final adjustment points are uniquely determined by the shape of the demand curves. Equilibrium will occur in a way similar to the case of linear demand. If the curves are not monotonically decreasing, there may be several points that give maximum sales, but probably only one will be the maximum maximorium. By the previously described slow steps of adjustment, this peak may never be reached but if mutual dependence is recognized, there will be instantaneous adjustment, with both sellers at their best positions.

Position of Three Sellers

EQUILIBRIUM WITH THREE -- The adjustment becomes complicated with the appearance of the third seller, C. He will enter at the point where he expects his total sales to be at a peak. This may be at the center, or between one of his competitors (A or B) and the end of the market. The point of entry is uniquely determined by the distance of A and B from the center (F, in equation 4) which, as established before, in turn depends on marginal sales-loss ratio.

C will find it profitable to enter in the center if the marginal sales-loss ratio is such that h/m is smaller than $-1/4$.(12) If h/m is greater than $-1/4$, then C will choose to enter on the side. This is obvious in the extreme case when $h/m = 1$. In this case A and B are bunched in center and C would not have any market if he entered between them.

Suppose, the location of his competitors is such that C decides to enter in the center. In this case both A and B will find that they can increase their sales by moving a certain distance towards their respective ends. The formula for their new position is analogous to equation 1. Equation 1 shows B trying to find his obtimum distance from the center, assuming A's original position unchanged; in the present case B and A will move to a similar distance from the center, with C remaining centrally located.

Therefore, we have the formula for A's and B's positions which they achieve in response to C's entry between them:

6. $\alpha = \pm \frac{2a}{5}(1-h/m)$

$\pm\alpha$ = the optimum distance of A and B from the center after adjusting their positions in response to C's entry. (The positive value refers to one seller, the negative one to the other.)

If we compare the absolute value of α with that of F (distance of A and B from the center before C's entry occurs), we see that $\alpha = 6F/5$, regardless of the marginal sales-loss ratio and the size of the market.(13) This proves that, in order to increase their own sales, both A and B will move away from C, after C's entry at the center, leaving for C a larger profit area than he had at the time of his entry. If C had found the center of the market the best place to enter, then he would find it *a fortiori* the best position after A and B have adjusted their locations. Since no one has any further incentive to move, this will be the final equilibrium situation.

There is no such simple adjustment if C happens to find that entry at one of the ends means greater sales than entry at the center. This will be the case when $h/m > -1/4$.

After C enters on the side, B finds that he can recapture some of his lost sales by moving towards the center. In response to B's movement, A and C will also find it profitable to move. A's and C's movements will be in the same direction as the initiating movement by B, but smaller. Again B will find it profitable to take a step in the same direction as before but a smaller one; this starts the cycle again. In the simple case of linear demand, each step will be 1/5 of the previous one; the steps constituting a convergent geometric series.

We can intuitively see that the limit will be reached when B gets to the center. Upon reaching the center, B will reach a relative maximum, i.e., he will not be able to increase his total sales by taking small steps in either direction. The same will be the case for both of his competitors.

This would be an equilibrium situation, were it not for the fact that B may find it profitable to leave the central position and jump over to one of the sides. If this is the case, then the stepwise movement towards the center will be started once again. Obviously, in this case, no equilibrium would exist.(14)

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(12) The exact lower limit of h/m for central entry of C is somewhat more than $-1/4$. For mathematical derivation, see Appendix, IV.

(13) $\alpha/F = [(2a/5)(1-h/m)] \quad [(a/3)(1-h/m)] =$
$= (2/5) \quad (1/3) = 6/5 \qquad \alpha = 6F/5$

(14) For three rivals and inelastic demand, as Lerner and Singer showed, there is no equilibrium. (*Loc. cit.*, pp. 178-179.) In our analysis, instability *may be* the result. Furthermore,

MUTUAL DEPENDENCE RECOGNIZED -- If mutual dependence is recognized, C will settle in the middle only if his total sales, after all the adjustments, are not less than they would have been if he had chosen a side location between one of his competitors, say B, and the end of the market. If C chooses a central location, the boundaries of his sales will be $\pm 1/2\alpha$. α being the point where C's competitors will move, in response to his entry. (See equation 6.)

C knows that he could settle on the side of, say, B and this would initiate a series of steps that would terminate when B reached the center. This, in effect, would mean that he could push B (or A) to the center and he could occupy B's postion (i.e., he could interchange positions with B). He will prefer to jump if his total sales are smaller than B's. As a matter of fact, in the central position the total sales are always smaller than at the side, unless $\alpha = 2a/3$. In this limiting case all three have an equal share of the market and none of them has an incentive to move.

We can show that $\alpha = 2a/3$ only if $h/m = -2/3$,(15) but this, as we have found, is the lower limit for h/m if we are still to obtain a determinate solution with three sellers.

As long as mutual dependence is recognized and unless $h/m = -2/3$, C will find the central location less advantageous than the side location. His entry between, say, B and the end of the market will initiate a series of steps that will put B in the center and C in B's former position. B will now reason as C did before and he will try to avoid being in the middle by jumping over one of his competitors, say, C. Now C, being pushed to the center, decides to jump and the cycle continues. We arrive at an interesting conclusion: if mutual dependence is recognized then we have no equilibrium solution for three sellers -- except in the unique case when $h/m = -2/3$.(16)

COST OF MOVEMENT -- Let us now take the cost of movement into consideration. Suppose that C enters at the outside of B.

In response to C's entry, B will try to increase his sales by moving towards the center with C following him and A moving away from him. The turning point of the cycle will come about when B reaches the center and A and C came to be located at α distance from him. If the cost of moving is taken into account, we see that the turning point of the cycle will never be reached. Equilibrium will be attained when the cost of adjustment becomes equal to the gain resulting from the moves (which is a function that diminishes with every subsequent move and approaches zero when the steps become infinitesimal). In our example, equilibrium will result when B is stopped in his movement toward the center with C behind him. A, located in the other half of the market, will continue to enjoy greater sales than either B or C. A's sales will be greater the further away B happens to be when he stops because of the cost of movement.

Therefore, equilibrium will be reached even with three sellers if we take the cost of movement into account. The conclusion is the same whether mutual dependence is recognized or not.

NONLINEAR DEMAND CURVES -- Regardless whether we have linear or nonlinear curves, as long as demand is monotonically decreasing, the result will be basically the same. Other things being equal, there will be equilibrium up to a

(14 cont.) the similarity between our instability and that of Lerner and Singer is superficial. It can be shown that, in their case, a stable equilibrium would result if we assumed that the rivals recognize their mutual dependence. That is to say, one of the sellers, being alone at one of the quartile points and controlling half of the market would be ill-advised to surrender his strategic location. He could increase his sales only momentarily by closing in on his competitors; one of his rivals would soon capture his favorable place. However, in our case, the instability is not due to the rivals' disregard of their mutual dependence. With elastic demand there is never a point when any of the sellers could stop the cycle and still retain a favorable position. The third seller, who in Lerner and Singer's demonstration keeps the cycle going, has no reason to close in on his competitors. With moderately elastic demand he never has an incentive to move too close to the others; nonetheless, they continue whirling around each other. The instability is maintained not by one seller trying to make his profits even larger, but because one of the sellers, squeezed into a very unfavorable position, tries to escape.

(15) $\alpha = (2a/5)(1-h/m)$; when $\alpha = 2a/3$, $2a/3 = (2a/5)(1-h/m) \quad \therefore \quad h/m = -2/3$

(16) This demonstrates that the three sellers case with inelastic demand, as examined by Lerner and Singer, presents a different type of instability. The Lerner and Singer instability stops if mutual dependence is recognized; in our case, when the marginal sales-loss ratio is moderately low, mutual dependence guarantees instability.

certain value of the marginal sales-loss ratio; above the critical value, there will be constant milling about.

Introduction of the cost of moving will lead to equilibrium for any value of the marginal sales-loss ratio. The exact location will be determined by both the marginal sales-loss ratio and the cost of moving.

Position of Four Sellers

EQUILIBRIUM WITH FOUR -- The entry of a fourth seller, D, will guarantee stability. The final result is a symmetrical arrangement; two in each half of the market, no matter where the fourth seller gains entry.

Suppose D enters when stability has been achieved among the first three sellers, A, B, and C. His entry will occur at the outside of A or B.(17) Say, he enters to the right of B. To regain some of his lost sales, B will move towards the left, causing C also to move to the left, which in turn will bring about a leftward movement of A. D will follow B, causing new steps of adjustment to the left.

This stepwise adjustment is similar to that with three sellers. Likewise, the steps will approach zero, and the movement will come to an end. This will happen when A and C are occupying positions in the left half of the market which is the mirror image of the positions of B and D in the right half.

The points of equilibrium for A and C (and by the same token for B and D) can be derived if we consider them as two sellers in a market that is half of the original one. As was shown in the case of two sellers, this will be a stable equilibrium.

The same eventual equilibrium would have been reached if, prior to the entry of the fourth seller, instability had prevailed. In that case, the entry of the fourth seller would be a stabilizing factor.

The limits of the final equilibrium are significant. The determining factor is again the marginal sales-loss ratio h/m:

(a) It is no longer necessary for the marginal sales-loss ratio to be very high to reach the conclusion shown by Lerner and Singer.(18) Even with a moderate value of the marginal sales-loss ratio ($h/m \geq 0$) their conclusions are valid, and the sellers will pair up at the quartile points.(19)

(b) Conversely, the indeterminate range diminishes with the addition of more sellers. Unless the demand becomes zero at a point which is less than 1/4 of one side of the market ($-3/4 \leq h/m < 0$), there will be a determinate equilibrium.

(c) Only if the marginal sales-loss ratio is very low ($h/m < -3/4$), will there be multiple solutions.

MUTUAL DEPENDENCE RECOGNIZED -- If mutual dependence is recognized, adjustment will occur immediately. This will eliminate the cost of multiple adjustments if there is a cost factor.

COST OF MOVING -- Without the recognition of mutual dependence, final adjustment would occur in an infinite number of ever-smaller steps. The element of cost would prevent the achievement of the final point of adjustment. Only those steps would be taken whose cost is less than the resulting gain.

NONLINEAR DEMAND CURVES -- Nonlinear demand curves would not significantly alter the argument. The reasoning given for two sellers may be easily extended to four sellers.

Five and More Sellers

We are now in a position to extend the conclusions to any number of sellers.

The fifth seller (E) will find it most advantageous to settle in the middle. On the basis of the preceding analysis, it can be shown that his closest competitor will never be closer to the midpoint than to the quartile point; therefore E will find that his profits will be maximum if he settles in the center.(20)

After E's entry, his competitors will move away from him to recoup some of their lost sales. After this adjustment, E's best position will *a fortiori* be in the center. The result is a stable equilibrium which is similar to the three-

(17) For derivation, see Appendix, V.

(18) *Loc. cit.*, pp. 177-180.

(19) This is obvious if we consider that, as more sellers are added, the market available to each seller is diminished. This has the same effect as if we had increased the marginal sales-loss ratio and kept the market constant.

(20) The only time his profits are no greater in the center than between A and B (or between C and D), is if $h/m = 1/4$. However, this case does not vitiate the derivation of the final equilibrium position.

stable equilibrium which is similar to the three-sellers case when the entry of the third occurred in the center.

With six sellers the final adjustment will occur when three of the sellers shifted to one half of the market and the rest to the other half. The conditions of equilibrium are analogous to the cases discussed under three sellers. There will be stability or not, according to the marginal sales-loss ratio h/m. Due to the fact that there are more sellers, each will have to contend with a relatively smaller market. Diminishing the market with respect to a constant marginal sales-ratio has the same effect as decreasing the marginal sales-loss ratio with respect to a constant market. In either case we shall be led to the Lerner and Singer solutions with inelastic demand. Therefore, an increase of the number of sellers will increase the applicability of the simple, inelastic demand analysis. That is to say, as the number of sellers increases, a point will be reached when they will pair up at equal distances along the line. Only an extremely low value of the marginal sales-loss ratio would significantly postpone this cnclusion.

The solutions can be generalized. In case of odd numbers the equilibrium would be immediately stable, and it would occur analogously to the five-sellers case. In case of even numbers, half of the sellers would locate in one half and the rest in the other half of the market. Each half of the sellers would adjust as if they were completely separated from the rest. Since the adjustment for even numbers involves a slight modification of the case for half of them,(21) by induction we can apply the previously discussed rules for any case involving an even number of sellers.

In any case, if more sellers were added, the simpler analysis presented by Lerner and Singer would, after a point, become applicable. We see that for larger numbers, the analysis, based on the assumption of inelastic demand, is not at all unrealistic.

Summary

We have seen that eventually there will be a constellation of sellers just as Lerner and Singer demonstrated. At first, new sellers will be attracted who will be able to enter without greatly encroaching on the territory of existing sellers. This is essentially the process by which markets become quickly saturated when a new, unpatented product is introduced. (22)

Let us define "saturation" at the point where the marginal sales-loss ratio, for each seller, becomes so high that the sellers locate according to the Lerner and Singer analysis.

Before the point of saturation, any seller who contemplates entry may expect that his sales will be as great as that of his most prosperous competitor. Therefore, entry will be encouraged.

Entry will not stop, however, when the sellers are so numerous that the Lerner and Singer type, inelastic demand analysis becomes relevant. Take the equilibrium position of any odd number of sellers. As Lerner and Singer demonstrated all, but one, will make the same amount of sales, and the remaining one will sell twice as much as any of the others. Any new seller would have an incentive to settle next to the lucky one and take away half of his sales. (He would still have as much as any of the others.)

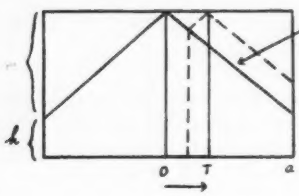
Entry will also be encouraged if there is an even number of sellers. In equilibrium, an even number of sellers will pair up in, n/2 groups (n is the number of sellers). Each will control 1/nth sequent of the line. The new seller, by settling between any two pairs, would immediately gain control over 1/nth of the line, and after the adjustment of his competitors, his share would even increase. The new entry would, of course, reduce the share of the old sellers, eventually forcing marginal sellers off the line.

(21) The only modification being that marginal sales-loss ratio is diminished by a readily ascertainable amount.

(22) "Product" is used in the Chamberlinean sense; it may mean only a slight variation of the old "product."

Appendix

I. Optimum position for the second seller (B) if the first seller does not move.



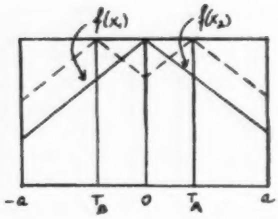
$$f(x) = m\,[-x/a + 1 + h/m]$$

$$= \int_0^{T/2} f(x)\,dx - \int_{a-T}^{a} f(x)\,dx$$

$$d\Pi/dT = m\left\{\tfrac{1}{2}[(-T/2a) + 1 + h/m] - [((T-a)/a) + 1 + h/m]\right\}$$

$$\hat{T} = (2a/5)\,(1-h/m); \qquad d^2\Pi/dT^2 < 0$$

II. The reaction of the first seller (A) to the entry of the second (B).



$$f(x_1) = m[x/a + 1 + h/m]; \qquad f(x_2) = [-x/a + 1 + h/m]$$

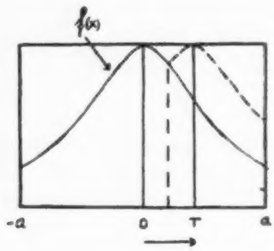
$$- \int_{T_B/2}^{(T_A + T_B)/2} f(x_2)dx \qquad - \int_{-a}^{T_A - a} f(x_1)\,dx$$

$$d\Pi/dT_A = m\left\{\tfrac{1}{2}[(-(T_A + T_B)/2a) + 1 + h/m] - \right.$$

$$\left. - [T_A/a + h/m]\right\}$$

$$\hat{T}_A = (1/5)[2a\,(1 - h/m) - T_B]$$

III. General case for two sellers.



$$= \int_0^{T/2} f(x)\,dx - \int_{a-T}^{a} f(x)\,dx$$

$$d\Pi/dT = \frac{1}{2}\,f(T/2) - f\,(a - T)$$

$$\frac{1}{2}\,f\,(\hat{T}/2) = f\,(a - \hat{T})$$

IV. Optimum position for the third seller (C), with A and B located at $F = \pm a\,(1-h/m)$.

Condition for central entry: $A_c \geq A_s$

$A_c = F\,(m + h - Fm/2 + Fm/4a) = am/36[-13\,(h/m)^2 + 2\,(h/m) + 11]$

$A_s = a_1\,(h_1 + m_1/2) + \beta/2\,(m_1 - h_1 - 5\beta\, m_1/4a_1)$

Where $a_1 = a - F$; $\beta = (2a_1/5)\,(1 - h_1/m_1) = 2/5\,[a(1 - h/m) - 2F]$

$m_1 = (a-F)m/a$; $h_1 = h + m - (a-F)m/a$; $F = a/3\,(1 - h/m)$

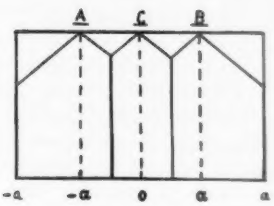
$A_s = am/90[26\,(h/m)^2 + 68\,h/m + 41]$; Since $A_s \leq A_c$

$am/90[26\,(h/m)^2 + 68\,h/m + 41] \leq am/36[-13\,(h/m)^2 + 2\,h/m + 11]$

$h/m \leq (-64 \pm 685)/117$; Since $h/m \geq -2/3$,

$\therefore$ condition for central entry: $-2/3 = h/m \doteq -1/4$

V. Entry of the fourth seller (D): always on the side.



(i) If D entered between 0 and $\pm\alpha$, his market share would be $\alpha/2$

(ii) If D entered between $\pm\alpha$ and $\pm a$, his market share would be $(a - \alpha)$

Since $\alpha = (2a/5)\,(1 - h/m)$

$\alpha/2 = a[1/5\,(1 - h/m)]$ and

$a - \alpha = a[(1/5)(3 - h/m)]$

Since $h/m \geq -2/3$; therefore

$\alpha/2 < a - \alpha$ Q.E.D.

MR. KALDOR ON GROWTH AND INFLATION

Douglas C. Dacy*

Of the many problems which economists have to deal with none is more crucial than that of growth and inflation. The theory of economic growth since the time of Harrod's pioneering essay in the theory of economic dynamics [1] has made elaborate gains even if the tools of that model, the capital-output ratio and the savings ratio, have generally remained as cornerstones. Unlike the theory of growth, the problem of inflation is not new to economists, having attracted its share of attention since time immemorial; however, the classic statement of its causes, "too much money chasing too few goods," while vivid enough leaves too much unsaid. Our concern today is with one particular species called "creeping inflation" and looked upon in some quarters as an "invisible but deadly enemy." [2-1258]

Progress in the resolution of the problem of inflation has coalesced with the advance in theory of economic growth. Today the general consensus is that they are not separate problems; but on the question of how they fit together there is a wide divergence of opinion. They are, according to Mr. Martin, Chairman of the Federal Reserve Board, ". . . inseparable. Price stability is essential to sustainable growth." [2-1262] We all know the views of the late Professor Slichter on this topic, in contrast with the above. More recently a group of experts, studying the American post-war inflation, found that policies "designed to stabilize the price level do not automatically promote growth . . that the promotion of growth will not be sufficient to halt the inflation . . . [and, in fact] inflation and growth are not separate problems." [3-xxi] In this maze of contradictory statements it is fortunate for economists that Mr. Kaldor has attacked the problem from a purely theoretical point of view and with all the vigor and perception which we have come to expect from him. The purpose of this paper is to present and augment, where necessary, these important and interesting insights. [4, 5, 6, 7]

Mr. Kaldor on Growth:

First it is necessary to say a word about Kaldor's growth model. Unlike its predecessors Kaldor's long-run rate of growth is not determined by any particular savings ratio, but is determined by a "technical progress function" and by a force called the "technical dynamism" of a capitalist society. Technical dynamism is nothing new: it is just a descriptive terminology for the innovating and inventive spirit of entrepreneurs. Ceteris paribus, the more vigorous are the entrepreneurs of a free society the higher is the potential long-run rate of growth. The technical progress function refers to the ability of a capitalist society to "absorb" capital. More specifically, it gives the relationship between the growth in output and the growth in capital stock without distinguishing whether a particular increase in production is due to capital-saving or labor-saving innovation, or without attempting to say whether it resulted from a movement along a given production function or shifts in the production function, a distinction empirically almost impossible. (1) Thus, the technical progress function shows the rate at which an economy can raise its capital-labor ratio over time.

Let us assume a linear technical progress function given by Kaldor's equation: (2)

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(1) K. W. Rothschild has criticised Kaldor for this point. He points out that Kaldor had not really got around the "ticklish" problem of labor-saving and capital-saving innocation; but has merely assumed something about them by the form of his technical progress function. In Fig. 1, for example, TT′ has a positive intercept; output gains may be registered without increases in the capital stock. This implies capital-saving innovation. The movement up TT′, since full employment is assumed, must imply labor-saving innovation. In general, Rothschild's criticism of Kaldor's model is that it makes gratuitous assumptions; for example, the theory follows from the assumption that there is, in fact, a long-run equilibrium rate of growth. It does not prove that there is one. [8]

(2) This linear equation is given for simplicity. Actually, the function is not assumed to be linear, and is given by the following form:

$$f'\left(\frac{1}{K(t)}\cdot\frac{dK}{dt}\right) > o; \quad f''\left(\frac{1}{K(t)}\cdot\frac{dk}{dt}\right) < o.$$

Presumably, after a point, percentage increases in capital fail to return equal rates of increases in output. This is not proved, and so may be taken as an assumption.

1. $$\frac{Y(t-1) - Y(t)}{Y(t)} = \alpha'' + \beta'' \frac{I(t)}{K(t)}$$

where $\alpha'' > 0$, and $\beta'' < 1$

In Fig. 1 TT′ shows the relationship described by equation 1. Change in output per worker over time is a function of change in capital per worker over time (population assumed constant). The intersection at G gives the long-run rate of growth in output and is stable. In order to understand the dynamic process by which G is reached it is necessary only to introduce an investment function which makes investment, in the short-run, dependent upon the capital output ratio. (In his equations

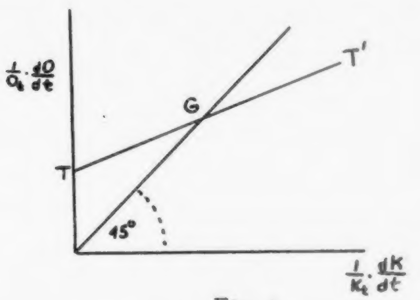

Fig. 1

Kaldor gives investment as a function of the profit rate, and the profit rate is a function of the capital-output ratio and the rate of growth itself.) Thus, at any point to the left of G on TT′ output is growing faster than capital which implies that the capital-output ratio is falling and the profitability of capital investment is rising. The rate of capital accumulation is increased until G is reached.(3) To the right of G the reverse process is set in motion. The height of the TT′ curve depends on the technical dynamism mentioned above. In a sense, then, α'' is some measure of the vitality of entrepreneurs.

Solving equation 1 with the long-run investment function (the 45 degree line in Fig. 1) the long-run rate of growth of income is obtained.

(3) In order to ensure such a point as G, Kaldor makes explicit two conditions:

$$P(t) < Y(t) - W_{min}$$
$$\frac{P(t)}{Y(t)} > m$$

Wages are higher than the subsistence level and the rate of profit on turnover is higher than some minimum acceptable to entrepreneurs.

2. $$G = \frac{\alpha''}{1 - \beta''} = g''$$

Equation 2 gives the essence of Kaldor's growth model. Its striking difference from other growth models is that the long-run rate of growth depends neither upon a predetermined savings ratio nor upon any particular accelerator coefficient. In fact, however, it turns out that the savings ratio is itself determined by the rate of growth, and the long-run capital output ratio settles down to some constant. In the place of these familiar pieces of furniture there is substituted a technical progress function whose parameters set the pace at which the capitalist economy must grow if it is to maintain long-run equilibrium. While this conclusion is novel, it by no means exhausts Kaldor's bag of surprises. To the others we now turn.

The Aggregate Demand Function:

The fact that corporations finance their investment projects primarily with internal funds gives, perhaps, one of the biggest jolts to the Classical and Keynesian models. Thus, whereas the earlier theories held that investment was determined by the simultaneous solution of two independent schedules, modern theory demonstrates the interdependence of the investment demand schedule and the cost of funds schedule.(4) Aside from the fact that his is a long-run theory, Mr. Kaldor's departure from the Keynesian analysis comes at this juncture. Kaldor denies that the propensity to save is wholly dependent of the level of investment; and in his own reasoning the independence assumption breaks down as soon as it is realized that the propensity to save is an aggregated relation which depends upon several constituent propensities. Incomes can be broken down into two broad classes: persons who receive profits and non-profit income earners, and separate propensities are assigned to each group. Since the propensities are different the aggregate propensity will depend upon the share of income going to each group which, in turn, depends upon the level of investment. Thus, the aggregate propensity is not independent of the level of investment. When investment is strong and income is rising profits are also rising. The propensity to save out of profits is larger than the propensity to save out of non-profits, and so, large amounts of investment means higher incomes, higher profits (relatively), and more investment since in equilibrium savings equal investment. [6-215] Now, if this is true, as it seems to be, the propensity to save through its reciprocal,

(4) This new theory is worked out in some detail by Professor James Duesenberry. [9]

the multiplier, does not determine the level of income, as Keynes thought. These separate propensities determine the distribution of income; or, stated more directly, investment does not determine income but, rather, the distribution of income. (5) This needs to be shown.

Let s be the aggregate propensity to save which is made up of α and β where α is the propensity to save out of profits and β the propensity to save out of non-profits.

3. $sY = \alpha P + \beta(Y - P)$; P is profits

and

4. $\frac{S}{Y} = (\alpha - \beta)\frac{P}{Y} + \beta = s$

which is Kaldor's savings function. In long-run equilibrium, $\frac{I}{Y} = \frac{S}{Y}$ and substituting $\frac{I}{Y}$ in 4 and re-arranging we get

5. $\frac{P}{Y} = \frac{1}{\alpha - \beta} \cdot \frac{I}{Y} - \frac{\beta}{\alpha - \beta}$

which shows that the distribution of income depends upon the percentage of income invested (or saved).

One notices that equation 4 is the reciprocal of the Keynesian multiplier, and it is useful in the calculation of the level of aggregate demand. Let Q be the aggregate demand.

6. $Q = \frac{1}{(\alpha - \beta)\frac{P}{Y} + \beta} I$

Equation 6 if plotted on the standard price-quantity coordinate system will yield a downward sloping demand curve if investment is held constant and $\alpha > \beta$. Under the assumption that a price increase changes the relative share in favor of the profit receivers, the aggregate propensity to save must increase lowering the value of the multiplier and decreasing the amount purchased. (6)

(5) According to Rothschild these separate propensities cannot have a long-run permanence; that is, they are not constant. Their values must be influenced by many institutional factors which help decide in the short-run how any particular distribution of income was achieved. [8-579, 580]

(6) This profit-price relationship is stated by Kaldor, but for some reason he does not include it in his system of equations. Since it is a necessary relationship required by the aggregate demand function, I shall include it below as a part of the system.

With a given wage (say, set by long-term wage contract) marginal costs are assumed to be constant, at least until full employment is reached, and then they turn upward rather steeply but not vertically. From the marginal cost curve we can get a supply curve which, however, will lie above the marginal cost curve due to market structure. On the level of the "representative firm" the supply curve will not intersect the average total cost curve at its minimum point but somewhere to the left of it. At the point of intersection the entrepreneur is making a "normal" profit, in addition to covering total costs. This is his "full cost" level of production. If demand is strong enough to induce him to expand production beyond this point, he will increase output by increasing the size of plant, i.e., invest. This is called induced investment.

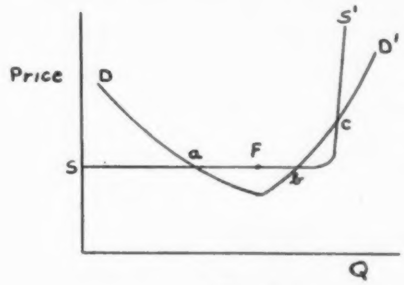

Fig. 2

Let SS' be the supply curve discussed above and point F on SS' be the full cost level of production. The falling part of the demand curve DD' is given by equation 6. As indicated, it slopes downward and intersects SS' in a. It then begins to rise just below F because at F entrepreneurs begin to increase their investment. (7) Equation 6 can be rewritten to take account of induced investment.

7. $Q = \frac{1}{(\alpha - \beta)\frac{P}{Y} + \beta} (I + I')$

I' is induced investment, and for $Q < F$, $I' = 0$; but for $Q > F$, $I' > 0$. The rising part of DD' intersects SS' in b and c. However, a and c are stable equilibria, while b is not stable.* Intersection at "a" is a depression situation with much unemployment, whereas c is a position of full employment and higher prices. Position

(7) For a discussion of the properties of the DD' curve see p. 5, col. 1 where I make an attempt to be more specific about its shape and position.

* According to the Marshallian quantity-reaction conditions.

b is not likely to exist for any period of time; and especially if there is a tendency for prices to rise as we must expect if $I' > O$. Also it is not possible to have any growth while at position "a" since there is no inducement to invest. On the other hand so long as there is some inducement to invest full employment is assured. Kaldor's conclusion is that in a capitalist economy we are either in a slump or full employment conditions prevail.

Growth and Inflation:

By focussing attention on those factors which govern profits, Kaldor breaks away from a sheer mechanistic determinism based on the accelerator. Investors are prompted to action only if the marginal efficiency of investment is high enough to justify their fears. That is, the marginal efficiency schedule must lie sufficiently above the marginal cost of funds for any amount of investment to repay the capitalist for the risk he is undertaking. According to Kaldor it is a risk of illiquidity of capital (goods-producing) assets which cannot be transferred freely into more liquid assets such as bonds or money. One cannot say just exactly what the risk premium is. Taking an historical view of the British economy, Kaldor estimates it to have been about 10% before taxes. Assuming no change in risk attitudes, if capital is to be accumulated at a sufficient rate to ensure steady growth in the economy, the rate of return on capital must be at least 13% if the long-term rate of interest is 3%.

The link between Kaldor's growth model and his theory of inflation is given by his equation which connects the rate of profit on capital with the rate of growth of income.

$$8. \quad \frac{P}{K} = \frac{g'' - \beta \frac{Y}{K}}{\alpha - \beta}$$

$\frac{Y}{K}$ is determined by the system and is constant in the long-run; and, of course, g'' is determined by the coefficients of the technical progress function. It is necessary constantly to bear that relationship in mind.

The risk premium referred to above we shall call the "required spread", and designate it r. i is the rate of interest. The "required return" on capital let us call r', where $r' = r + i$. (The "required return" is equal to the "required spread" plus the rate of interest.) Now, from equation 8 it can be seen that the rate of profit varies directly with the rate of growth, g''. If this rate of growth is not large enough to generate a rate of profit, $\frac{P}{K}$, such that $\frac{P}{K} > r'$ (the required return), then, entrepreneurs will not invest, and the economy cannot grow. It follows that that particular g'' cannot be maintained. But, if g'' is large enough such that the rate of profit is greater than or equal to the "required return," then, indeed, investment will take place and this g'' can maintain itself. Thus, in order to maintain itself, the rate of growth must be high enough to generate a sufficiently high profit rate which will equal or surpass the rate required due to the risk of illiquidity.

The above argument has been stated in real terms. It is more complicated in money terms, and here is where inflation comes into the picture. By the very definition of inflation the money rate of growth, the money rate of profit, and the money rate of interest exceed the real rates of growth, profits, and interest. However, inflation does not treat each of these alike; for example, it favors profits relatively to interest. To obtain real rates from the observed money rates it is, therefore, necessary to deflate the money rate of interest by a larger amount than the money rate of profit. (8) In fact, we assume the greater the inflation the larger becomes the divergence between the real rate of profit and the real rate of interest. And the simple conclusion is that at some rate of inflation the real difference between the money rate of profit and the money rate of interest will be sufficiently large to repay the capitalist the required risk premium, i.e., at some rate of inflation $\frac{P}{K} > r'$. This result is shown in Fig. 3.

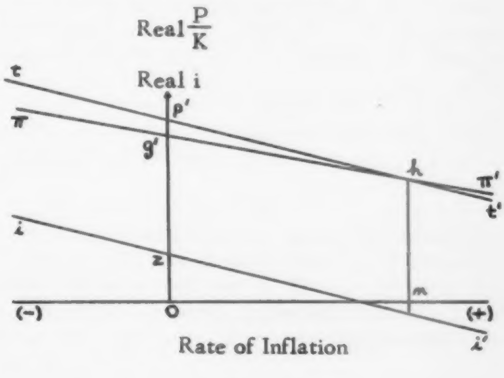

Fig. 3

(8) This statement is perfectly general; however, it is not used by Kaldor. He gets the same result by making a different assumption, namely, that the money rate of interest cannot fall below some level set by liquidity preference as discussed by Keynes in his General Theory.

Let ii′ show the functional relationship between the rate of inflation and the real rate of interest and $\pi\pi'$ the relation between the real profit rate on capital and the rate of inflation. For our purpose it is a sufficient condition that $\pi\pi'$ and ii′ diverge for positive rates of inflation and converge for negative rates (deflation). Oz is the real rate of interest with no inflation (and thus the money rate, too) and Og the real rate of profit generated by a real rate of growth of g′. Let zP′ be the real risk of illiquidity which must be met in order to induce the capitalist to invest. Through P′ draw a line tt′ parallel to ii′. It is clear that the necessary risk premium is met at h which means n inflation.

The height of g′ depends upon Kaldor's g″ (the long-run equilibrium rate of growth) which is set by the "technical dynamism" of society. g′ will be higher in Fig. 3 only if the technical progress function in Fig. 1 shifts upward, (9) i.e., a higher growth rate according to equation 8 will give a higher rate of profit on capital. If the equilibrium rate of growth were such that g coincided with P in Fig. 3, then that rate of growth would maintain itself without inflation. However, if g were high enough so that g were greater than P then it would be possible to maintain that rate of growth with falling prices. (10)

Before we leave Fig. 3 we should note emphatically that if inflation did not favor profits relatively to interest (if $\pi\pi'$ and ii′ were parallel) then there would be only one rate of growth which could maintain itself, and that particular rate would be consistent with any amount of inflation or deflation, i.e., $\pi\pi'$ would be the same as tt′. (11)

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(9) Actually what is required is an increase in α or β, the parameters of the technical progress function.

(10) Kaldor does not mention this possibility. He seems to think that growth and falling prices are compatible only if population is growing faster than the rate of growth of income consistent with stable prices.

(11) The policy implications from this analysis are, indeed, interesting. It should be possible, for example, to empirically determine the functional relationships shown in Fig. 3. Given that information one would be able to solve a set of equations to determine what rate of inflation would be necessary to support a range of growth rates. Then money could be supplied to the economy in accordance with the quantity theory. Also it is interesting to note that inflation can

Properties of The Aggregate Demand Function:

Now, let us leave Mr. Kaldor and begin to explore some new territory suggested by his approach. While the trail ahead is very uncertain, it offers so many interesting possibilities what we must feel our venture fully compensated.

First of all we take a look back at Fig. 2 and the peculiar demand curve drawn there. It is the result of a gallant attempt to integrate macro and micro analyses. The axes measure price and quantity, but the properties of the curve are derived from more than meets the eye. The price-quantity relationship really depends upon the parameters α and β, the response of $\frac{P}{Y}$ to price changes, and the volume of investment. The following relationships appear evident. (12)

(1.1) $Q = Q(p, k, I, I', \alpha, \beta)$ p is price

(2.1) $p = p(Q, I, I', M)$ M is the money stock

(3.1) $k = k(\frac{P}{Y}, \alpha, \beta)$; k is the multiplier

(4.1) $I' = F(\frac{P}{Y}, \frac{K}{Y})$ $\frac{K}{Y} = \bar{c}$

(5.1) $\frac{P}{Y} = P(p, Q, \frac{I + I'}{Y})$

(6.1) $Y = pQ$

A rise in the price level will decrease the amount demanded (1.1). However, an increase in investment ($I' > O$) will, ceteris paribus (given k), increase the amount demanded (1.1). But an increase in I, ceteris paribus, will tend to raise prices and, at the same time, will tend to raise profits and, thus, lower k [through (2.1), (5.1) and (3.1)]. It is seen, then, that the elasticity of the rising part of the demand curve

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(11 cont.) be cured only by raising the rate of growth which should be possible by raising society's "technical dynamism." If we could make our businessmen more enterprising (say by cutting taxes)-- make them accept more risky ventures -- then it would turn out that these same ventures would prove less risky. Entrepreneur's vigorous actions would raise the rate of growth and thereby raise the rate of profit on capital.

(12) At the present time I am not worried about setting up a complete and determinate system of equations. I am concerned only with pointing out a few relations on which the shape and position of the demand curve depend.

shown in Fig. 2 is a complicated matter which may be broken down into three parts.

(i) The "pure price effect": a rise in prices will tend to lower Q and, hence, yield a negative elasticity.

(ii) The "multiplier effect": an increase in investment will increase Q through the multiplier. In this case, the larger is the capital-output ratio the larger is induced investment, and, if k is given, the larger is the increase in Q.

(iii) The "interaction effect": Rising prices and increases in investment tend to lower the value of the multiplier (given α and β) and, therefore, to reduce the impact of the "pure" multiplier effect.

If the "pure price effect" is very weak, and the "interaction effect" is weak, i.e., rising prices give only a slight advantage to entrepreneurs, so that k does not fall very much, then a large "multiplier effect" caused by a high capital-output ratio will ensure a positive elasticity of the demand curve. Whether it rises to the right more or less steeply will depend upon the outcome of the three effects. An analogy might help clarify this point. Under the "pure price effect" the demand curve is tending to bend to the left, but the "multiplier effect" tends to pull it to the right; but the "multiplier effect" is damped a bit because the harder it pulls the less potent becomes a given effort, since the value of the multiplier is delining all the time. (It is sort of like pulling with an elastic band.)

The rather interesting conclusion of all of this is that depending upon the strengths of the three effects the rising part of the demand curve in Fig. 2 can take on a range of elasticities. It may rise as Kaldor has indicated in his diagram and in which case his conclusion holds. But, it may rise more steeply, in which case it may not intersect SS$'$ in c, but at some point higher than c; indeed, it may not intersect the inelastic range of the supply curve at all. Or it may rise very slowly, in which case it may pass to the right of SS$'$, that is, not intersect it at b or c. These three possibilities deserve a little attention. (13)

One supposes that the last mentioned possibility is the least probable. Such a possibility would indicate a rather large capital-output ratio coupled with only a slight reduction in the multiplier (a weak "interaction effect") and a weak pure price-quantity response. In an aggregated model of the type we have here there is no reason to assume a particular weak price elasticity. (14) Furthermore, placed in its dymanic setting, a high capital-output ratio would cause a relatively slow shift in the SS$'$ curve to the right; but entrepreneurs are likely to undertake the necessary amount of expansion only if $\frac{P}{Y}$ is rising rather rapidly, which means the "interaction effect" is very strong, and, thus, k is declining significantly We may call this the "no intersection" case (15) and state that it is not likely.

But now suppose that the capital-output ratio is very small and that the pure price-quantity relation is highly elastic and the "interaction effect" is strong. A very low capital-output ratio will assure, over time, that SS$'$ shifts to the right rather quickly because a small increase in the capital stock, given the size of the labor force, increases production rapidly. This rapid shift in SS$'$ coupled with a rather steep rise in the demand curve offers the possibility that an intersection with SS$'$ will occur only at some point such as b which is not stable. Any movement away from b to the right will send prices soaring, and this situation is what we call galloping inflation. Our economy under these conditions is either in a slump or suffers from severe inflation. (16)

However, the most likely case is Kaldor's own. The conditions for Kaldor's intersection at c are that we are confronted with a "moderate" capital-output ratio, a "moderate pure price elasticity of demand, and a "moderate" "interaction effect." In the case of "moderation" SS$'$ shifts to the right (over time) but the elasticity of the demand curve will be such to ensure some point of stable intersection.

There is one more point which I should like to mention but which I have not had time to work out in detail. The slope of Kaldor's DD$'$ curve

(13) Tangency is also possible.

(14) Indeed, it is difficult to say anything at all about the elasticity of an aggregate demand schedule.

(15) The interpretation given to this unlikely case is that a capitalist economy is doomed in the long-run to a condition of slump, i.e., intersection at a. One notices also how such an unlikely case contradicts the basic Domar model in which a high capital-output ratio yields a long-run growth at a lower rate.

(16) The business cycle implications from Kaldor's model should become clear at this point.

has been discussed, but not its position. Its leftness or rightness depends upon the size of $(I + I')$ whereas its vertical position depends upon the quantity of money. As I increases then we should allow for a continual shift in DD' to the right, just as we have allowed for dynamic shifts in SS'. Now, given the slope of DD', continually rising prices (over time) will be possible only if SS' shifts more rapidly than DD'. Furthermore, it is possible that at some rate of growth the shifts in SS' and DD' will be such that the locus of all points of equilibria will be horizontal, i.e., prices are steady. This situation is difficult to visualize on Fig. 2 because that diagram is static. In its place something like the following diagram is needed.

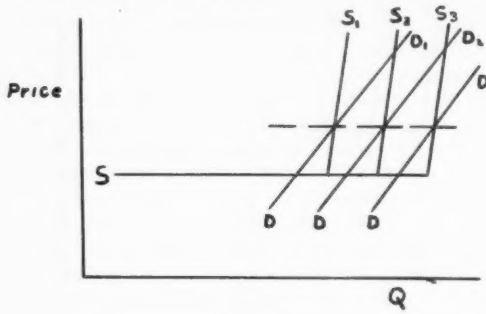

Fig. 4

While Mr. Kaldor never states his theory explicitly in these terms, it seems to me that this dynamic interpretation is deducible from his system. Of course, if the interpretation given above is incorrect then certainly, Mr. Kaldor is not to be held responsible.

Conclusion:

We have investigated Mr. Kaldor's model of growth and inflation. It seems reasonable in so far as it goes. It seems to me that the model is not totally complete, and I have attempted to supply some of the missing links; but even here they have only been indicated and not worked out in any detail.

REFERENCES

(1) R. F. Harrod, "An Essay in Dynamic Theory," Economic Journal, March 1939

(2) "Investigation of The Financial Condition of the United States," Hearings before the Committee on Finance United States Senate, Part 3, Eighty-fifth Congress, First Session

(3) Staff Report on Employment, Growth, and Price Levels, Prepared for Consideration by the Joint Economic Committee Congress of the United States, Eighty-sixth Congress, First Session (Dec. 24, 1959)

(4) N. Kaldor, "Alternative Theories of Distribution," Review of Economic Studies, March 1956

(5) . . . . . . , "Economic Growth and the Problem of Inflation -- I," Economica, August 1959

(6) . . . . . . , "Economic Growth and the Problem of Inflation -- I," Economica, August 1959

(7) . . . . . . , "Economic Growth and the Problem of Inflation -- II," Economica, November 1959

(8) Kurt W. Rothschild, "The Limitations of Economic Growth Models," Kyklos, Vol. XII, 1959, Fasc. 4

(9) James Duesenberry, Business Cycles and Economic Growth, McGraw-Hill, 1958

ECONOMIC DEVELOPMENT IN INDIA UNDER THE SECOND FIVE YEAR PLAN

William E. Strevig*

INTRODUCTION

This report presents the findings of an analysis of economic planning in India. The purpose of the analysis was (a) to describe the background and objectives of the planning, and (b) to appraise the effect of the plans on Indian economic development.

Most of the discussion concerns the Second Five Year Plan which covers the period 1956-61. Some of the discussion, however, also touches on the First Five Year Plan, which covered the period 1951-56, and on other Plans that will follow the Second.

The discussion in this report is purposely limited to rather broad statements concerning the philosophy of the plans and their probable effect on the feature course of Indian economic development. The details of the plans' targets and administrative machinery are fully described in publications which are readily available (1, 2), and need not be reproduced for purposes of this analysis.

SUMMARY AND CONCLUSION

In India planning has reached a highly refined state, and pervades the entire economy of the country. The general philosophy can be summed up as follows: "Development is a process of utilizing more and more effectively the resources of the community in furtherance of accepted ends.... A plan is an attempt to improve upon the results that can be achieved under an unregulated and uncoordinated play of private decision." (1)

The origin of the plan rests in a desire to overcome India's abject poverty, and to reach the goals in India's constitution. The plan was formulated by a central Planning Commission with participation by persons in regional governments and in central ministries. The objectives were selected to be realistic. A detailed machinery has been set up to over-see the workings of the Plan.

The objectives of the Plan are clearly set forth in great detail. Broad goals are to initiate self-sustaining economic development, raise living standards, and rebuild backward areas. Economic objectives are to increase national income by 25%, gently increase industrialization, expand employment, and bring about a redistribution of income. There are also specific targets set for individual industries in terms of production and investment.

Among the multitude of factors which will determine success or failure, one of the most important is the relation of the plan to environmental conditions. Politically, India's stable central government is conductive to effective planning, although there exist differences of opinion on the extent to which India must turn to socialism. In social terms, there are several major obstacles to effective planning. In economic terms, effective planning requires overcoming inadequacies in almost every major industry. Another important determinant of success is the logic of the plan itself - in general it seems reasonable, but has a few apparent inconsistencies.

Opinions of experts vary widely on the likelihood of success for the Plan. On the basis of these opinions and the analysis in this report, it seems reasonable to anticipate that the Plan will bring about substantial progress in the desired directions. However, the complexity and immensity of the Plan suggest that many specific targets may not be met.

There appears to be ample evidence to support the conclusion that planning in India will contribute significantly to its primary goal - alleviation of the restrictive poverty and abysmal standard of living of the Indian people.

I. ORIGIN OF THE PLAN

This section presents a discussion of how the Second Five Year Plan originated. The discussion is divided into the following broad topics: A. the need for planning, B. the formulation of the plan, C. the selection of objectives, and D. administration of the plan.

A. The Need for Planning

At least three basic reasons can be cited as an explanation of the need for planning in India. The first is the widespread, deep, almost hopeless poverty which characterizes a major part of the Indian population. The second is the lack of any basis for "take-off" into sustained economic

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growth which is the only means for alleviating the poverty. The third reason is the desire to fulfill the idealistic goals of the Indian constitution.

1. Poverty - The seriousness of the poverty in India can be described in two ways; one statistical and the other in terms of examples. Statistically, Indian living standards are among the lowest in the world. Per capita income is about $60 per year, about the lowest of any of the countries in the world for which data are available. Educational achievement is very low - only half of the 6 to 11 age group and 20% of the 11 to 14 age group attend school (3). Only 16.6% of the population is literate (3). In terms of industrial goods, Indian per capita consumption of energy and steel is roughly 1% of that in the U. S. (3).

2. Lack of Basis for "Take-Off" - The second important reason why planning is necessary in India is the fact that, in the absence of planning, India is not likely to develop the pre-conditions for "take-off" into self-sustained economic development. The pre-conditions that the plan seeks to accomplish are as follows:

(a) Raise national income above the subsistence level. Because national income is below subsistence level, there is little opportunity for savings to occur, and hence only limited investment is possible. As income rises as the result of various measures in the plan. there will be greater opportunity for investment.

(b) Increase the proportion of workers employed in industry relative to agriculture. In India about 80% of the population is rural, but this segment accounts for less than half of the national income. According to Higgins (4) there is limited opportunity for increases in per capita output in agriculture, hence there should be a shift of workers to higher productivity industry and, "On the basis of comparative advantage, India should probably be an importer of foodstuffs and an exporter of products of heavy industry".

(c) Increase the ratio of savings to national income. Some progress was made in this direction during the First Five Year Plan, with an increase to 10%. The Second Plan seeks to increase this to 16% (1)

(d) Take advantage of certain external economies possible in creation of social overhead capital. This includes power, transport, communications, etc., which private investors find too risky to undertake. These projects must precede other directly productive investment.

Higgins (4) presents an excellent discussion of several concepts of the mechanism by which the "take-off" is initiated. The Rosenstein-Rodan hypothesis is based on the indivisibilities of (a) the production function, (b) demand, and (c) the supply of savings. Leibenstein states that in undeveloped countries there exists a tendency for enterpeneurs to invest in projects which yield a profit but which do not substantially raise national income as a whole. Nelson's theory of the low-level equilibrium trap suggests that it is necessary, to get out of the trap, to increase the rate of growth of income to level say 3% higher than the rate of increase in population. Sinzes, Nurkse, and Hirschman cite the necessity to channel investment according to certain patterns.

If any or all of these ideas have any validity, the necessity for over-all planning is evident.

3. Desire to Implement the Constitution - At the time that India achieved independence and formed a new government, there were written into the constitution some provisions very similar to certain parts of the U.S. constitution. The preamble of India's constitution declares that it aims to secure for all citizens:

"Justice - social, economic and political;
Liberty of thought, expression, belief, faith, and worship;
Equality of status and of opportunity; and to promote among them all
Fraternity assuring the dignity of the individual and the unity of the nation."

In more specific terms, the Constitution also states,

"The state shall, in particular, direct its policy toward securing:

a. That the citizens, men and women equally, have the right to an adequate means of livelihood;
b. that the ownership and control of the material resources of the community are so distributed as best to serve the common good;
c. that the operation of the economic system does not result in the concentration of wealth and means of production to the common detriment.
d. that there is equal pay for equal work for both men and women;
e. that the health and strength of workers, men and women, and the tender age of children are not abused and that citizens are not forced by economic necessity to enter avocations unsuited to their age or strength;

f. that childhood and youth are protected against exploitation and against moral and material abandonment."

The Planning Commission takes the position that, to realize these objectives, it is essential to accelerate the rate of economic growth and to speed up industrialization. In particular, the Commission seeks to develop heavy industries and machine making, and to expand the public sector and the co-operative sector. These, the Commission feels, provide the economic foundation for increasing opportunities for gainful employment and improving living standards and working conditions.

In view of India's present position - poverty, religious tabus, language barriers, low education level - it seems reasonable that some planning is essential to achieve the constitutional goals.

B. Formulation of the Plan

This section describes very briefly the process by which the plan was formulated. The process is of profound importance because it is believed to be an important factor in success or failure of the Plan, as described in a later section. Two years' effort went into the plan before it became effective in April, 1956. Because the Plan was formulated over a period of two years, was widely publicized, and was left open for comment by everyone, it represents the best thinking of many experts, many with widely different points of view. One observer pointed out that every conceptual device, statistical tool, and theoretical argument ever used or mentioned by economists was considered in formulating the plan.

This fact is important. It means that the plan has been subjected to detailed scrutiny of its assumptions, its logic, and its practicability. It is not the work of a small group with strong bias or limited viewpoint. It is the result of distillation of many expert contributions- this fact greatly increases the chances that the plan is workable.

C. Selection of Objectives

In selection of the objectives of the plan, several key policies dominated the thinking of the Planning Commission. These key policies are discussed below under the following headings; 1. Determination of realistic goals, 2. Degree of detail, 3. Relation to longer range plans, and 4. Relation of plan to institutional framework.

Other important policies had a bearing on the selection of objectives. However, those discussed below appear to be the most important.

1. Determination of Realistic Goals - The Second Five Year Plan, like the First and the others to follow, is based on the selection of goals which appear possible to achieve with hard effort. The goals were derived from a detailed analysis of (a) available resources, (b) the optimum sequence of development in different sectors, (c) historical perspective, and (d) development records in other countries.

The basic objective is to achieve a socialist pattern of society. As stated by the Planning Commission, "Essentially, this means that the basic criterion for determining the lines of advance must not be private profit but social gain, and that the pattern of development and the structure of socio-economic relations should be so planned that they result not only in appreciable increases in national income and employment but also in greater equality in incomes and wealth." (1).

Within this broad framework, the selection of specific objectives was carefully rationalized from certain basic premises. There was little thought given to the propaganda value of spectacular improvements in one or more sectors, as characterizes Soviet planning and China's "Great Leap Forward". In part, this policy stems from a desire to prevent any feeling of frustration from unrealized goals.

2. Degree of Detail - The statement of objectives is very detailed in terms of anticipated changes in investment, output, and relative growth rates of individual sectors. The degree of detail of planning is partially revealed in the section headings of the plan (1), for example:

Chapter XIV -
- Animal Husbandry and Fisheries
- Cattle breeding policy and programs
- Dairying and milk supply
- Control of diseases
- Sheep and goats
- Poultry
- Research and education

Chapter XXV -
- Health
- Hospital services
- Health units
- Medical education
- Dental education and services
- Nursing and other training programs
- Medical research
- Indigenous system of medicine
- Control of communicable diseases
- Water supply and sanitation
- Nutrition
- Maternal and child health

Family planning
Health education

These chapters are but two, selected as examples, of some 30 chapters covering every aspect of Indian economic, social, and cultural life. Each of these chapters describes the basic characteristics of the sector and its relation to the entire economic system.

Planning in such detail has both advantages and disadvantages. It has the advantage of making the plan more nearly complete, with less likelihood of overlooking any significant aspects. In addition, the making of specific-plans and objectives for each sector of the economy and each geographic region, brings the plan closer to the "grass roots". Each person can comprehend, in specific terms, his part in the over-all plan. On the other hand, detailed planning has the disadvantage of increasing the likelihood of setting targets which will not be met. It might be possible, for example, to achieve all of the broad goals, such as a 25% increase in income, without meeting any specific targets for individual industries. Such a result could have adverse effects on acceptance of the plan by the public, who may see only a narrow segment rather than the over-all gains.

3. Relation to Longer Range Plans - The Second Five Year Plan is but one of a series, all carefully integrated. It is a logical outgrowth of the First, and much of the thinking on which it is based is derived from experience with the first plan. The important relationship among the successive plans is accelerated growth in national income, investment, and per capita income. The major objectives of each of the plans, showing the relationships among them, are shown in the table below.

The central objective, around which all else is designed, is to double per capita income in the generation from 1951-56 to 1971-76.

4. Social and Cultural Goals - In establishing economic goals, the Planning Commission also set forth certain social and cultural goals which were made an integral part of the over-all plan. The Commission took the position that a rising standard of life is not an end in itself, but is a means to a better intellectual and cultural life. Economic development, as viewed by the Commission, "is intended to expand the community's productive power and to provide the environment in which there is scope for the expression and application of diverse faculties and urges". The Commission states that "The task before an underdeveloped country is not merely to get better results within the existing framework of economic and social institutions but to mold and refashion these so that they contribute effectively to the realization of wider and deeper social values".

PROJECTED VALUES OF SELECTED MEASURES OF ECONOMIC GROWTH IN INDIA, 1951-1976

ITEM	1st Plan 1951-56	2nd Plan 1956-61	3rd Plan 1961-66	4th Plan 1966-71	5th Plan 1971-76
National income at end of period (Billion dollars)	$21.6	$27.0	$34.5	$43.4	$54.5
Total net investment (Billion dollars)	$ 6.2	$12.4	$19.8	$29.6	$41.4
Investment as percent of income at end of period	7.3%	10.7%	13.7%	16.0%	17.0%
Population at end of period (Millions)	384	408	434	465	500
Incremental capital - output ratio	1.8:1	2.3:1	2.6:1	3.4:1	3.7:1
Per capita income at end of the period (Dollars)	$56	$66	$79	$93	$109

SOURCE: Government of India, "Second Five Year Plan," 1956

The importance attached to social goals is evident in the discussion in the next chapter. Great stress is laid on reduction of unemployment, not so much for its economic value as for the reduction of social unrest. In addition, redistribution of income is considered as important as aggregate increases in income.

The following statement by the Commission may be interpreted as suggesting that social, rather than economic, objectives are of prime importance:

> "For several plan periods to come, it is on the mobilization of the effort rather than on the gains and returns arising therefrom that attention has to be concentrated. The gains and returns are important, but more important is perhaps the satisfaction that a community gets from attempting a worthwhile task which gives it a chance to lend its energies to productive and socially useful purposes. The 'costs' of development, viewed in this light, are a reward in themselves. There is no doubt....a community can draw upon the latent energies within itself to an extent which ensures development at rates much larger than nice calculations of costs and returns on inputs and outputs may sometimes suggest." (1)

D. Administration of the Plan

As part of the administration of the plan, the government has established an elaborate system of controls. These controls, in effect, apply both to entry of new firms into an industry and to the expansion of existing firms. The controls cover such activities as imports and exports, raising of new capital, and investment of capital. Each of these activities requires a specific license. There are also direct controls over prices, costs and profits.

In addition to these more direct controls, the government wields extensive power indirectly through tax and credit policies. The government can grant accelerated depreciation and tax concessions to new enterprises. Tax policies with respect to reserves and dividends are another indirect means of exerting control.

Another broad power granted to the government is that of ensuring that established enterprises in scheduled industries are conducted in conformity with national objectives. One authority describes the implementation of this power as follows:

> "....the Government may make a full investigation of enterprises where it believes that there has been or is likely to be an unjustified substantial decline in production, an avoidable marked deterioriation in the quality of an article, or an unjustifiable rise in the price of an article. It may also initiate an investigation where it believes that the management of an enterprise is being conducted in a manner highly detrimental to the ....industry....or public interest. After an investigation, the Government may issue directives to the enterprises concerned regulating the production or the price of any article or class of articles, may require the enterprise to take steps to stimulate development of the industry, or prohibit the enterprise from resorting to any act or practice which might reduce their productivity, capacity, or economic value. Where the directives are not complied with the Government may take over the management of the industry for a period not to exceed five years." (6)

Another authority describes the over-all administrative machinery as follows:

> "....the nearest comparisons to the Indian economy are the wartime disequilibrium economies of the United States and the United Kingdom, with their proposed levels of military expenditure and their basic system of controls of prices, investment, outputs, and inputs, combined with a willingness (not based on socialistic grounds) either to start industries (as the atomic energy program) or to take over on a temporary basis such firms as Montgomery-Ward when it was felt this was necessary." (9)

II. OBJECTIVES OF THE PLAN

This section outlines very briefly the objectives of the Second Five Year Plan. These objectives fall into three categories, each of which is described in turn: A. broad goals, B. economic objectives, and C. specific targets for individual sectors of the economy.

A. Broad Goals

1. Initiate Development - The planning in India seeks to bring about an economic "take-off", following which the economy will be launched on self-sustaining economic growth. This goal has been described as follows:

> "Rapid and self-sustained growth is understood to require....not only substantially higher rates of investment but also the establishment of basic producer goods industries within the country. Higher rates of

investment, once attained, are expected to result in higher rates of growth of output. Higher rates of growth of output are expected to sustain themselves by making it possible to maintain or even raise further these higher rates of investment - and to do so without undue strain on the balance of payments, once the heavy industries are in place. In this way, it is planned to reverse long-established trends and change the whole traditional pattern of poverty, low productivity and unemployment. The extent to which the plan succeeds will therefore determine not only the progress that is registered during the period of this plan but also, to a significant extent, the rates of development that can be attempted in succeeding plans." (5)

The Planning Commission has added other features to this goal of initiating development. The Plan seeks to generate a spirit of dynamism throughout the entire economy, mobilizing to the fullest possible extent the efforts of all persons. In addition, it is hoped that the Plan will provide the environment for expression of individual drive, thus developing entrepreneurship. Finally, the Plan seeks to exploit to the fullest extent possible all of the country's available natural resources.

2. Raise Living Standards - The primary goal of initiating development, and the economic objective of increasing per capita income as cited below, carry with them the implication that living standards will be increased. However, very little has been left to chance, and the Plan has provisions to insure that certain attributes of higher living standards will be realized after per capita income grows beyond the subsistance level.

In terms of education, the Second Five Year Plan provides for emphasis on basic education, expansion of elementary education, diversification of secondary education, improvement of standards of college and university education, extension of facilities for technical and vocational education and the implementation of social education and cultural development programs.

There are health programs whose aim is to expand existing health services, to bring them increasingly within the reach of all the people, and to promote a progressive improvement in the level of national health.

Extensive provisions are made for improving national housing standards. The Second Plan calls for a total investment of $240 million in programs for subsidized industrial housing, low income group housing, slum clearance, middle income group housing, and plantation housing.

3. Secure Geographically Balanced Growth - Although little is stated explicitly in the exposition of the Plan about geographical distribution of growth, it has been agreed in principle that within the resources available, every effort must be made to provide for balanced development in different parts of the country. Wherever a choice exists in locating new industries, e.g., where raw material or other factors do not dictate a particular location, consideration will be given to the need for balanced development in different parts of the country.

In addition, steps are planned to increase mobility of labor throughout the country, and to organize schemes of migration and settlement from more to less densely populated areas.

B. Economic Objectives

There are four important objectives that are largely economic in nature, and around which the over-all plan is built:

1. The development of basic industries and capital goods industries. This objective is translated in the plan into specific targets for iron and steel, non-ferrous metals, coal, cement, heavy chemicals, machine tools, electrical machinery, etc.

2. A rise of 25% in national income (representing a yearly rate of growth of income of about 4.6%), and of 21% in aggregate consumption, as compared to the estimated increase in the population of 7% over the period.

3. An increase in full-time employment sufficient to absorb 8 million persons, and an aggregate demand for labor sufficient to match the increase in the labor force. The employment targets are implicit in the production and investment targets and in the techniques specified in some cases.

4. A step-up in the rate of net investment in the economy from 7.3% of the national income, as in 1955/56, to 10.7% of the national income by 1960/61, and a parallel improvement in the rate of net investment covered by domestic savings from 7.05% of the national income to 9.7%.

C. Specific Targets

The specific targets for the Plan are of two types, investment and production.

The investment target for the public sector over the five year period totals $8.2 billion, a-

bout half to be made by the national government and half by state governments. Of this total, about $6.7 billion represents investment in tangible assets, and about $1.5 billion is in current development expenditures. Anticipated investment in the private sector is about half that in the public sector, or about $4.1 billion dollars.

The allocation of public sector total investment among major functions is as follows:

ALLOCATION OF PUBLIC SECTOR INVESTMENT

Agricultural and community development	11.8%
Irrigation and power	19.0%
Industry and mining	18.5%
Transport and communications	28.9%
Social services	19.7%
Miscellaneous	2.1%
	100.0%

SOURCE: Government of India Planning Commission, "Second Five Year Plan," 1956

Selected production targets of greatest significance are listed below. The percentages represent anticipated increases over the Plan period. From this list the emphasis on capital goods is clearly evident.

PLANNED INCREASES IN SELECTED AREAS OVER THE PLAN PERIOD

	Percentage Increase
Foodgrains	15%
Jute	25%
Cotton	30%
Irrigated areas	31%
Electric capacity	103%
Iron	191%
Coal	58%
Finished Steel	231%
Pig Iron	97%
Aluminum	233%
Machine Tools	300%
Sugar Machinery	779%
Freight Tonnage	51%
Hospital Beds	24%
Public Nurses	583%

SOURCE: Government of India Planning Commission, "Second Five Year Plan," 1956

III. DETERMINANTS OF SUCCESS OR FAILURE

The planning process is highly complex, and a multitude of factors will play a role in determining whether or not the planning is successful. This section of the analysis presents a discussion of two of the most important factors: relation of the plan to economic, social, and political conditions, and the logic of the plan itself.

A. Relation of the Plan to Environmental Conditions

1. Political Setting - The success of planning in India is abetted by the fact that there exists a strong, orderly, centralized government. Much of the strength of the central government, of course, lies in the leadership ability of Mr. Nehru himself. In addition to political unity, there appears to be general belief in the need for planning to achieve economic development.

There is less unanimity, however, in the means of starting economic growth, and whether the socialist form of society is best for India. Some persons believe in socialism as a desirable goal in itself, while some others look on the socialistic order simply as a tolerable end. For example, one writer states that

> "....[The] outlook which prevails [in the various Ministries concerned with India's industrialization] is markedly empirical and pragmatic and generally speaking quite untinged by any doctrinaire preference for state action for its own sake. The attitude of mind is rather that the job to be done is one that is beyond the resources of privately organized industry, as it exists in India, and one that must subserve certain broad social aims which have long since been achieved in western industrialized countries.... To the extent that private industry is willing and able to play its part, it is to be encouraged to do so, but the Government is not willing to extend that encouragement so far as to wait upon private industrial initiative where it considers that development is urgently required, or to give a completely free hand in an economy which is admittedly a controlled one." (8)

Another writer arrives at a similar conclusion, but based on the notion that the change toward a socialist order is more apparent than real:

> "The steady increase in the role of the public sector superficially indicates an ap-

proach toward the socialistic pattern of society so apparently loved by Indian political leaders and feared by Western private investors. In fact, however, the great increase in investment in the public sector largely reflects the concentration of investment in a few industries - primarily in the three government-owned steel plants in which an investment of 3.5 billion rupees is planned, a government investment for which there may be ideological reasons but also for which private funds would not be sufficient; in several chemical plants which are byproducts of larger government multi-purpose projects; in certain railroad and communication product factories that are traditionally in the area of government; and in a very few projects that are considered strategic. Almost all of the investment in the consumer-goods sector and a large part of that in the capital goods sector, exclusive of steel, will be under private control. Although ideological elements play some part in the government's progress of entering industry, they are, in fact, limited by highly pragmatic considerations." (9)

An important political factor is the extent to which control over the economy is concentrated in the hands of relatively few people:

> "Trade and finance in India have always been confined to a narrow range of communities and large-scale industry has, for the most part, fallen under the control of a small section of financiers. It is safe to say that there is in India perhaps a greater concentration of economic power relating to industry, banking, and insurance than in most countries of Europe and America. The Indian situation appears to have a close similarity to that reported for China and Japan. An open field for private enterprise in India thus means essentially a field for private enterprise in India thus means essentially a field for the activities of certain groups of financiers and industrialists; private enterprise in India is also, in many other ways, far from being free enterprise." (3) (7)

This concentration of power, means that relatively few companies are involved in private sector investment decisions. This makes it possible for the government to enlist co-operation, in achieving the development goals, among only a few companies.

2. Economic Setting - The net income of India is about $22 billion. Agriculture accounts for slightly less than half of this total. Mining and manufacturing account for about 19%, commerce, transport and communications about 19%, and about 17% comes from other sources.

Agriculture is the dominant feature of the Indian economy in two respects: (a) as a percent of national income, and (b) as a problem area in India's striving for economic development. Roughly half of India's total area is cultivated, but production of food grains and commercial crops are not sufficient for India's own needs. India has one-fourth of the world's cattle population (plus about 43 million buffaloes), but the large number of useless or inefficient cattle constitutes a strain on the country's meager feed resources.

Industrial problems are varied, but stem basically from the fact of "not enough". Steel capacity will be about 2.9 million tons in 1960, with some additional capacity planned, almost 2 million tons short of requirements. The cotton mill industry is the largest single industry in India, and is an important source for exports. The cement industry is well developed, and the chemical industry is growing rapidly. A major problem is machine tools, 80% of which must be imported. Inadequacies also exist in such basic industries as automobiles, power, railways, roads, airlines, and communications.

These and other inadequacies throughout the economy have dictated the scope and nature of the planning process. Failure to reach objectives in any of the important sectors is likely to impair seriously the prospects for over-all achievement of the Plan's objectives.

B. Logic of the Plan

The Second Plan itself begins with a global target of a 25% increase in national income over the period. Productivity of investments was projected according to experience in the First Plan, and savings requirements were estimated accordingly. The projected rate of growth in income is double that over the First Plan period - this is based on an increase from 7% to 11% in the ratio of savings to income over the Second Plan period.

Investment is to be concentrated in heavy industries, introducing increased roundaboutness in the economy. Output of consumer goods will be increased through expanded cottage units. Financial resources will be seriously strained. Reliance for revenues is to be put on (a) increased tax revenues from higher income, e.g., a larger tax base, (b) borrowings, and (c) deficit financing.

The logic of the Plan assumes that the prevalence of mass disguised unemployment and low living standard is due to a shortage of capital equipment.

The stress on industrialization stems from the following reasoning:

> "....industrialization is a means of achieving continuous economic growth. Whether carried on by small but potentially expanding firms or by relatively large organizations, either privately or publicly owned, it leads to the creation of an economic surplus in the hands of those firms. With the relatively high marginal propensity to save and invest of these industrial firms, this sector contributes significantly to the eventual achievement of a self-sustaining economic growth with continued high levels of investment and a rapid rate of increase in income and industrial employment." (9)

C. Appraisal of the Plan

In evaluating the probable impact of the Plan on Indian economic development, two facts are self-evident: (a) the plan must have some substantial effect because of its scope and the mechanism established to achieve its objectives, and (b) the plan cannot be successful in all respects simultaneously, simply because the problem is so immense that the probabilities are low that any sector or group of sectors will reach its explicit goal. Viewed in this light, evaluation becomes a question of the degree to which the Plan objectives are likely to be achieved.

A frame of reference must be established. Should the Plan's achievements be measured in terms of the broad goals, the economic objectives, or the specific targets outlined in Section II of this report? Furthermore, is the proper reference the objectives selected by the Planners, or what would be achieved in the absence of the Plan.

In terms of the broad goals, it seems reasonable to expect success for the plan. The success of the first plan, the widespread acceptance of the concept of planning, and the growing understanding of the problems involved, suggest that the Plan is likely to initiate economic development and its attendent advantages. There is little evidence to suggest that India has entered a period of take-off into self-sustaining economic growth. However, the evidence does suggest that India is progressing toward a higher national income, improved living standards, and better regional distribution of economic activity.

In terms of economic objectives, success seems less likely. The projected 25% increase in income may be achieved if the plan doesn't falter for lack of foreign exchange to acquire capital goods. The same holds true for industrialization. The employment problem is not likely to be solved because of the relatively low employment-output ratio in the capital goods industries. The redistribution of income effects will take many years to evaluate.

Among specific industry targets, there is evidence that at least three key industries, chemicals, iron and steel, and engineering, may reach their targets. However, this is by no means assured. In addition, there are hundreds of industries for which targets have been set. If the growth in income and industrialization is accomplished, it can reasonably be expected that the major targets will be met.

In relation to India's economic development in the absence of the Plan, the Plan is almost certain to be a success. There is evidence that some of the capital-goods industries would never develop in the absence of direct participation by the government. Without these industries, development is blocked, and India's national income would remain at the same subsistence level where it has languished since national income was first measured.

REFERENCES

(1) Government of India Planning Commission, "Second Five Year Plan." (New Delhi, 1956).

(2) India Planning Commission, "The New India: Progress Through Democracy."

(3) Wall Street Journal, "Ike and India: Three Indians Typify Problems President Will Hear About On Visit" (November 24, 1959).

(4) Benjamin Higgins, Economic Development (New York: W. W. Norton and Company, 1959).

(5) Economic Commission for Asia and the Far East, "Planned Development in a Mixed Economy (India)," Published in Economic Survey of Asia and the Far East 1957 (Bangkok: United Nations 1958).

(6) U.S. Department of Commerce, "Investment Factors in India Today" (Mimeographed, June 10, 1959).

(7) D. R. Gadzil, "Economic Prospect for India," Pacific Affairs (June, 1949).

(8) Baljit Singh, Economic Planning in India, 1951-56 (Bombay: Hind Kitabs, 1953).

(9) George Rosen, Industrial Change in India (Glencoe, Ill.: Free Press, 1958).

The Role of Trade Unions in Planned Economic Development: China and India

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I

Introduction

As is well known, Communist China and India are each tackling the problem of economic development within radically different political and economic frameworks. Both countries are committed to planned development spearheaded by the central government, but the Indian economy is a "mixed" one, with both private and public entrepreneurship playing important roles, while the Chinese economy is almost totally controlled by the central government. Moreover, the Indian framework is one of parliamentary rule with dispersed political power, while political power in China is concentrated solely in the hands of the Chinese Communist Party, which controls the central government.

Given this, it seems clear that the methods which the central planners can utilize to solve their respective development problems must of necessity be very different. It is also true, however, that many of the problems faced by the Chinese and Indian central planners are similar. One general similarity is that both countries are primarily agricultural. At the same time, a crucial similarity exists in that the relatively small industrial sector represents in each a vital potential source of the capital necessary for economic development.

There are three major reasons for this latter phenomenon. First, despite the fact that these industrial sectors employ only a small percentage of the labor force, the productivity of workers in industry is much higher than anywhere else in the economy and hence the industrial sectors produce an important share of total national product. Second, one would expect that as economic development proceeds, a larger and larger share of total product will be provided by the industrial sector. Third, and perhaps most important, the chances of extracting the potential economic surplus and channeling it into capital investment would seem to be much greater in an industrial sector. This would be true for India and China if only because the potential surplus of the dominant sector in both, agriculture, can easily be consumed directly by the producers.

Given the above, it is clear that to government planners in China and India, the size of the economic surplus actually produced in industry is of vital importance. The trade union is a force which can greatly affect the size of this economic surplus. Trade unions may affect the level and structure of wages, and also the form of payment (e.g. - hourly versus piece rates). By their actions in the field of wages, trade unions may also influence labor efficiency, since there is clearly a relationship between wages (particularly their form) and labor efficiency; moreover, trade union strikes in connection with wages obviously and dramatically affect labor output negatively. Trade unions may also influence labor productivity positively by encouraging their workers to increase their efficiency and to maintain labor discipline. Finally, trade unions may affect the "technical level" of capital equipment by their attitudes toward rationalizations which involve the introduction of new machinery.

For these reasons it would seem important for students of economic development to understand the possible roles that trade unions can play in underdeveloped countries. It is the purpose of this paper to examine what those roles have been in India and China. In the comparative analysis that follows, we shall examine first the general features of the Chinese and Indian trade union movements. Thus, we shall examine and compare the structure of the trade union movements, their legal status and relations to the government, their aims and tactics, and their strengths and weaknesses as they affect the union's ability to carry out its goals. Secondly, and most important, we will turn to a comparative analysis of the function of the trade unions in particular aspects of economic development. Here we shall concentrate on the unions' influence on wages, labor productivity, strikes and labor discipline.

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The research for this paper was completed in May, 1958. To the best of the author's knowledge the situation has not changed materially since then.

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II

THE CHINESE TRADE UNION MOVEMENT

The single most important characteristic of the trade union movement in China today is that it is completely controlled by the Chinese Communist Party (CCP), and hence by the central government. There is only one legal trade union movement, (1) organized under the All-China Federation of Trade Unions (ACFTU). That this trade union movement is subordinate to the CCP is most clearly indicated by the words of the movement's own leader, Lai Jo-yu, Chairman of the ACFTU since 1953: "The trade union organizations...must maintain close connections with the masses and rally the workers around the Communist Party, serving as transmission belts between the Party and the masses."(2) Chao Kuo-chun, an authority on mass organizations in China, points out the mechanisms of control.

> There are two major channels through which the CCP controls and directs the ACFTU: through Party members and through government directives. Numerically, not only the key posts of the ACFTU are occupied by Party members, but the majority of the ACFTU hierarchy belongs to the Party. For example, (in 1953) the Chairman, two out of three Vice-Chairmen of the ACFTU, all the eight members of the Central Secretariat, and an absolute majority of the Presidium are members of the CCP...(3)

Given the fact that the Chinese trade union movement is controlled by the central government, it is not surprising to find that the principle aim and goal of the trade union movement is to aid the government in fulfilling its economic development plans. It the words of the Chairman of the ACFTU:

> The most important task of the trade unions is to unite and lead all workers, technical personnel and other employees so that they may consciously and actively develop production....(4)

From the above it is clear that the aims and functions of the Chinese trade unions are radically different from the ones traditionally associated with trade unions in Western societies. The Chinese trade unions are concerned primarily with mobilizing labor to increase total industrial output while the main preoccupation of the "Western" trade union is with the worker's share of the industrial output. However, both of these are important aspects of trade union work. Thus, one author notes:

> Viewed as an institution of an industrial society, the trade union plays two crucial roles - that of expressing the wage-welfare ambitions of the labor force and that of helping to maintain discipline. In various societies the two functions are blended in different proportions, but for the survival of an industrial society they must both be present.(5)

This helps us to answer an obvious and important question: Why, if the main function of the Chinese trade unions is to guide the worker toward increased productivity from which he will often not benefit directly, does such a high proportion of Chinese workers (probably over 80% as of 1952) join the unions? After all, union membership is voluntary(6) and dues are 1 per cent of

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(1) See Articles 3 and 4 of "The Trade Union Law of the People's Republic of China," contained in Labour Laws and Regulations of the People's Republic of China (Peking: Foreign Language Press, 1956), p. 6. For a history of the Chinese trade union movement see the only comprehensive one available: Nym Wales)pseud). [Helen F. Snow], The Chinese Labor Movement (N.Y.: The John Day Co., 1945).

(2) See the "Report on the Trade Union Work in China" by Lai Jo-yu, published in Seventh All China Congress of Trade Unions (Peking: Foreign Language Press, 1953), pp. 54-55, our emphasis. This document will hereafter be referred to as "Seventh Congress."

(3) Chao Kuo-chun, The Mass Organization in Communist China (mimeographed: Center for International Studies, M.I.T., Nov., 1953), pp. 26-27.

(4) Seventh Congress, op. cit., p. 56.

(5) Morris D. Morris, "Labour Discipline, Trade Unions, and the State in India," Journal of Political Economy, LXIII (Aug., 1955), 304.

(6) Seventh Congress, op. cit., pp. 139-140.

(7) See Current Background, No. 482, p. 16 (translations from various articles in the China Mainland Press, American Consulate General, Hong Kong).

a worker's monthly wages;(7) moreover, the majority of Chinese industrial workers are new to industry and have no traditions of unionism. The basic answer to this question lies in the fact that while the Chinese trade unions are oriented primarily toward increasing labor productivity, they also serve in a significant way as an agent of wage-welfare benefits.

One way in which the Chinese trade unions perform the wage-welfare function is by representing the workers in the drawing up of collective agreements between the industrial enterprise and the workers. There is no collective bargaining as it is known in the West; for one thing, the major weapon of Western trade unions in the collective bargaining process, the strike (or the threat of it) is effectively prohibited in China. However, collective agreements, which detail the wages, work quotas, etc., of the workers, are drawn up with the aid of union representatives.

Far more important than their very limited role in wage determination however, are the unions' functions as sponsor and/or manager of a wide range of labor welfare programs. One of the most important labor welfare programs sponsored by the ACFTU is a comprehensive system of labor insurance. Another welfare function handled through the trade unions is the construction of housing facilities for workers. The ACFTU also fosters and/or controls a wide variety of health, cultural, recreational and educational facilities and programs.

Given this wide range of welfare programs administered by the Chinese trade unions, it is not difficult to understand why (despite the fact that they are geared primarily to making the Chinese worker increase his output) such a high proportion of the workers has joined these unions. The welfare benefits which the Chinese worker derives from his union membership are undoubtedly worth far more than the relatively small union dues that he pays; thus, for every yuan paid by Chinese union member as dues, nine additional yuan are contributed by government and management.(8) Moreover, the Chinese welfare program is geared to ensure that there will be few "free riders", i.e. non-union members who do not pay dues, but derive benefits. The Constitution of the ACFTU explicitly stipulates that: "Trade union members have the right ...to enjoy priority in the various collective cultural and welfare establishments conducted by the trade unions."(9) (For example, in certain aspects of the labor insurance program, non-union members receive only half of the benefits received by union members.)(10) That Chinese trade union leaders are fully aware that the above provision provides a strong incentive for joining a union is clearly indicated by the following statement:

> Only by clearly defining and protecting the right of the members...to enjoy the benefits of the collective cultural and welfare establishments conducted by the trade unions, will there be a distinction between the trade union members and non-trade union members... This also serves as an education and encouragement to non-trade union members who should join but have not yet joined the trade union(11)

Without doubt another reason for the success of the Chinese trade unions in recruiting members is the pressure on workers to join unions which must exist in a country like China, where non-membership may be viewed as a sign of the individual's "political backwardness," if not worse. However, it seems apparent from all evidence that the positive incentives offered in the form of large welfare benefits are probably more important than the negative pressures, although both are operative.

It is our thesis that whatever successes the Chinese trade unions have had in fulfilling their primary aim of increasing labor productivity can be largely attributed to the incorporation in the trade unions of important wage-welfare functions. There is some evidence that the Chinese trade unions function with just this view of the relationship between their labor productivity and wage-welfare roles. Thus, one reason advanced for "giving priority" to union members in receiving wage-welfare benefits is that the members will "feel the honour and duty of being trade union members, thus enabling them to be enthusiastically concerned with trade union activities";(12) among these activities are of course many designed to increase labor output.

Before we turn to an examination of the specific ways in which the Chinese trade unions atempt to implement their labor productivity function, and their effectiveness in this area, we

(8) Chao Kuo-chun, op. cit., p. 49.

(9) Seventh Congress, op. cit., p. 131.

(10) Labor Laws, op. cit., p. 45.

(11) Seventh Congress, op. cit., pp. 92-93.

(12) Ibid., pp. 92-93.

shall make a comparative analysis of the general structure, functions, and aims of the Indian trade union movement.

III

THE INDIAN TRADE UNION MOVEMENT

An outstanding characteristic of the Indian trade union movement, and one that is in striking contrast with the Chinese, is that it is not a unified movement. There are in India today four large national federations of trade unions which dominate the trade union movement and each has goals, strategies, relations to the central government, etc. which are more or less different from each other. The strongest federation in terms of membership is that associated with the ruling Congress Party, the Indian National Trade Union Congress (INTUC). Next in size are the Socialist Party dominated Hind Mazdoor Sabha (HMS) and the Communist Party dominated All-India Trade Union Congress (AITUC); finally, lying politically between the Socialists and the Communists is the fourth and smallest federation, the United Trade Union Congress (UTUC).

From the point of view of economic development, the attitude of the Indian trade union movement toward the developmental plans of the central government (as embodied in the First and Second Five-Year Plans) is of vital importance. Unfortunately for the Indian government, the four-way split in the trade union movement has produced four different attitudes toward the developmental plans. At one extreme there is the INTUC which is closely allied to the ruling Congress Party and hence strongly supports these plans. Thus, the weekly newspaper of the INTUC, the Indian Worker, noted approvingly the following statement by a prominent trade unionist:

> We are in the midst of our Plan and we should remember that if the Plan fails we are doomed. It is the duty of every trade unionist to make the Plan a success. Workers should place the interests of the nation first and theirs next.(13)

At the other extreme is the Communist-dominated AITUC which is generally hostile to the government's development plans. This is indicated by a report of the General-Secretary of the AITUC:

> We do desire planned economy...Our main quarrel is that the schemes under the Plan are so made, the agencies that execute it are such and the methods followed are so highly bureaucratic, that the Plan will not build up the maximum good of the people, but will build the maximum profits and power of the monopolists and their State agencies.(14)

The positions of the HMS and the UTUC seem to fall between these two extremes. Given this, it is not surprising to find that there is some evidence that the government, which in theory is strictly neutral toward all the federations, may be lending support to the pro-government federations, particularly the INTUC. Claims have been made of government favoritism in two spheres: in those areas where one union is officially recognized as the "representative union" for collective bargaining purposes, and in reference of cases to adjudication when requested by the unions.(15)

Whatever the extent of active government aid for the favored federations, particularly the INTUC, it seems apparent that the Indian government, like the Chinese, clearly recognizes the desirability of a trade union movement dominated by groups which actively support its economic development plans. As one observer notes, "The Indian government is [also] trying to use the trade-union as the handmaiden of national development objectives."(16) However, there are a number of factors which prevent the Indian government from dominating and utilizing the trade union movement to anywhere near the degree which the Chinese government does.

The first and foremost obstacle to government control of the trade unions in India is India's basic political framework. Given the parliamentary forms and representative government which India has (and which do not exist in China) it would be practically impossible for the Indian government to outlaw all other unions except the favored ones (as was done in China). Moreover, given the democratic philosophy of the ruling Congress Party, it is highly unlikely that they would consider such a move desirable, even if it were

(13) Indian Worker, October 2, 1957.

(14) 24th Session of the All-India Trade Union Congress--Report and Resolutions (New Delhi: AITUC Office, October 1954), pp. 50-51.

(15) For data on this problem see Morris, "Labor Discipline," op. cit., 301, and Charles A. Myers, Labor Problems in the Industrialization of India (Cambridge: Harvard University Press, 1958), p. 282.

(16) Morris, "Labor Discipline," op. cit., 307.

feasible. Thus, even a scholar who has placed emphasis on governmental efforts to buttress the position of the INTUC notes that "the Congress government has not attempted to force all workers into Congress-dominated unions."(17)

But the existence of a number of different trade union federations, each with its own views on the functions of trade unions (and on the proper road to economic development) raises further barriers to governmental control of the labor movement. All of the federations are in competition for the support and control of the Indian worker. It is not unnatural that the Indian worker, who has an extremely low standard of living, will be strongly attracted to those unions which promise to obtain for him immediate benefits in the form of higher wages, better working conditions, etc. In such a situation there is a strong temptation for the federations to try and "outbid" each other in their promises to the workers. Moreover if the "highest bidder" is successful in winning the support of the workers, it must often make some attempt to fulfill these promises, lest it lose the workers' support. More often than not, attempts to gain the promised benefits will be resisted by employers and the union must be ready to resort to the strike as a weapon of coercion.

This places a severe strain on the Congress-dominated INTUC which, in line with the government's policy of preventing production-crippling strikes, is committed to the position that "Strikes and lockouts should have little scope when a democratic plan is being implemented." (18) The INTUC (which like the All-China Federation of Trade Unions stresses that workers should concentrate on maintaining discipline and increasing production in order to gain long run benefits) is thus at a distinct disadvantage in its competition with unions which have no such compunctions about aggressively pursuing short-run gains for the workers. In order to protect itself, the INTUC has on occasion been forced to utilize the strike, much against its will. Such action indicates the impossibility of the INTUC giving total support to the government; as one observer notes, "this would be out of the question where so many different federations compete for the 'proprietorship' of labor protest." (19)

(17) Ibid., 307.

(18) Indian Worker, Jan. 1, 1958, p. 59. From a statement made by the president of the INTUC, Shri Vasavada.

(19) Myers, Labor Problems, op. cit., p. 83.

A further major hindrance to any trade union attempt to promote economic development lies in the fact that by and large the Indian trade unions have failed to provide the wage-welfare benefits without which they cannot hope to guide the workers toward other goals. This failure is at least partially due to a tendency toward governmental control of the wage-welfare function. Thus, for example, virtually all the labor insurance protection which the Indian industrial worker enjoys results from the Employees State Insurance Act of 1948. Moreover, while in China the trade unions are the administrators of the labor insurance program and trade union members get higher benefits, in India the program is administered by a public body set up by the government and no distinction is made as to union membership. As a result the Indian trade unions have no control over this welfare function, and labor insurance benefits cannot be offered by the trade unions as an incentive to membership, as is the case in China. The same is true in the case of housing. If the Indian trade unions were effective in gaining wage benefits through collective bargaining, this might compensate for their inability to provide other welfare benefits. In fact, however, the government has tended to take over this function also, through provision for minimum wages and compulsory adjudication of many industrial disputes.

We have now completed our survey of the major features of the Indian and Chinese trade union movements. With these in mind, we can now examine more fruitfully the comparative roles played by the two union movements in specific aspects of economic development. In the following sections we shall analyze and compare the influences of the Chinese and Indian trade unions, respectively, on: wages, labor efficiency and rationalization, strikes and labor discipline. No attempt will be made to make precise quantitative comparisons (largely because of the lack of data, but also because of the difficulty of making quantitative inter-country comparisons), but rather we shall try to highlight the qualitative differences between the roles of the two trade union movements.

IV

CHINESE AND INDIAN TRADE UNIONS

A. Wages

The basic functions of the Chinese trade unions as regards wages are to ensure that the management of enterprises carries out the wage directives of the government and to convince the

Chinese workers of the "correctness" of the government wage policy.(20) The official government wage policy is geared primarily towards maximizing economic development, and secondarily towards the improvement of the workers' immediate standard of living. In order to implement these aims, the government's position is that wage increases should never be greater than increases in labor productivity, and that each individual worker's wages should be a function of his productivity.(21)

Aside from aiding the government in implementing its wage policy, the local Chinese trade unions have some voice in setting of wages at the individual factory level. The powers of the union in the wage sphere are of course greatly limited in that any agreements reached must be in line with general governmental policy. These powers do give a degree of flexibility to the wage system and particularly where they can be exercised toward better linking wages with productivity, probably exert a positive influence on economic development.

In India all four leading trade union federations are committed to the pursuit of higher wages for their members, but only the government-associated INTUC at all links wage increases to increased labor productivity. The president of the INTUC stated recently, "But an increase in wages is not likely to solve our problem....Reduction in prices is absolutely necessary and this is possible only by stepping up production."(22) There are further differences among the federations as to the degree of militancy with which they will struggle for higher wages, regardless of the effects on economic development. Thus, for example, while all the federations are in favor of minimum wages for each industry, the INTUC stands for allowing numerous exceptions. In general the INTUC probably puts the least pressure on employers for wage increases, while the other trade union federations are more aggressive, especially the Communist-dominated AITUC.

Moreover, unlike in China, the trade unions in India often work for wage payments which bear little relationship to labor productivity. This stems mainly from the fact that the basic wage in India (whether piece rates or time rates) is usually supplemented by "dearness allowances" (essentially cost of living payments) and/or bonuses, which are frequently as large as the basic wage payments. Thus, for example, in the Bombay cotton textile industry the basic wage ranges from only 33 to 55 per cent of total wage payments.(23) The "dearness allowances" are usually tied to the cost of living and as such bear no relationship to productivity, but are based on the profits of the firm or the industry, and are given to all workers, regardless of their contribution.

B. Labor Efficiency and Rationalization

The most important function of the Chinese trade unions is to lead and guide the workers toward the increase of labor productivity, particularly through "labor emulation". Trade union work in the development of labor emulation among the workers has had two stages.(24) At first, so-called "shock work," or working harder and longer hours with the same equipment and technique, was emphasized. These shock techniques, while increasing output in the short run were probably injurious to the workers' health, and if continued over a long period of time would undoubtedly have been detrimental to long-run labor efficiency. The Chinese trade unions were conscious of this and, after a short period, emphasis was laid on the "higher level" of labor emulation. This higher level consisted mainly of improving workers' techniques, without necessarily involving harder labor. At this higher level, the main functions of the Chinese trade unions were to encourage workers to initiate and develop the improved techniques, and then to popularize and spread these "advanced experiences".

The Chinese trade unions also work diligently at encouraging the invention by workers of new types of equipment in order to rationalize production. Chinese sources report that "From 1950 to 1953 the workers put forward 1,643,708 rationalization proposals, of which 781,956 have been put into practice."(25)

(20) Labor Laws, op. cit., p. 83.

(21) Hsiao Kung yu, "The Principle Underlying Wage Increase" (originally from Hsueh Hsi [Study] No. 15, August 3, 1957). (Translated in Extracts from China Mainland Magazine, No. 106, Nov. 4, 1957, Hong Kong, American Consulate General), 12.

(22) Indian Worker, Jan. 1, 1958, p. 57.

(23) Oscar A. Ornati, "Problems of Indian Trade Unionism, "Annals of the American Academy of Political and Social Science, Vol. 310, March 1957. (No. 57, Reprint Series of the New York State School of Industrial and Labor Relations at Cornell University.)

(24) Seventh Congress, op. cit., pp. 56-57.

(25) See Chinese Workers March Towards Socialism (Peking: Foreign Language Press, 1956), p. 21.

A number of methods are used to encourage the increase of labor productivity. First and foremost, labor efficiency is stimulated directly by the introduction of piece rates and bonuses based on individual output. Rationalization is also encouraged by direct material rewards. A Chinese worker whose invention is adopted receives a percentage of the value saved by the introduction of his invention.(26) The Chinese trade unions also try to stimulate productivity by staging "labor emulation drives" where workers in an individual enterprise are encouraged to compete with one another in increasing productivity, or where the workers of one factory "challenge" the workers of another one to a "productivity contest." Finally, a recent development in this field has been the organization of "workers' congresses" in individual enterprises. These workers' congresses are designed to increase labor productivity by giving the workers more of a sense of co-participation in the individual enterprise; as such they are similar to the worker-management councils which, as we shall see later, have been urged by some trade unions in India.

The work of the Indian trade unions in the field of labor productivity is in striking contrast with that of the Chinese trade unions. Little or no effort is made by the major trade union federations to promote increased labor efficiency. Rather, such is generally feared, since it might well lead to a reduction in the number of workers employed. Even the Congress-dominated INTUC, which is theoretically in favor of increasing labor efficiency, can do very little to promote it. This inability, we believe, is at least partially due to its lack of control of the wage-welfare function.

The only measure which any trade unions support in the area of improving labor efficiency are the formation of "joint councils of management." The INTUC has stated:

> Workers participation in management would go a long way to enthuse the workers towards implementation of the Plan. The second Five-Year Plan has recognized the need for it and has recommended the setting up, in the first instance of councils of management consisting of representatives of management, technicians, and workers in the larger industrial establishments. There is real need for realization of the workers' role as an integral part of the industry. There should be recognition of this status to enable him to take active and real interest in stepping up production.(27)

(26) Labor Laws, op. cit., p. 56.

(27) Indian Worker, Feb. 3, 1958, p. 3.

However, even here there is no agreement in the divided Indian trade union movement. The other three federations have little sympathy for this joint-council system, in part because they fear that the INTUC will be favored in appointment of representatives to the councils.(28) Thus, at present the joint-council system is not very widespread or important in Indian industry.

In the case of improvement of labor productivity through rationalization, the Indian trade unions definitely play a negative role. At one extreme we have the Communist-dominated AITUC which is most vehemently against rationalization. The AITUC in 1954 adopted a simple resolution which stated: "The General Council calls upon all workers to intensify their struggles against all forms of rationalization."(29) At the other extreme the Congress-dominated INTUC has vacillated between favoring and opposing rationalization. In 1951 the INTUC generally favored rationalization and agreed to help implement it under the principles embodied in the first Five-Year Plan. By 1954, largely due to the pressure of growing unemployment, "The General Council of the INTUC passed a resolution in May, 1954, urging the government to put a total ban on the introduction of automatic machinery." (30) In 1955, it hedged somewhat holding that "We do recognize that under certain circumstances certain labour-saving machinery will have to be accepted."(31) The positions of the HMS and UTUC fall somewhere between the INTUC and the AITUC, but probably closer to the latter in strong opposition to rationalization.

The basic reason why the trade unions oppose rationalization is of course that they fear loss of jobs for their members. To some extent the trade unions also believe that rationalization will not benefit the Indian economy because management will simply make extra profits which they will not reinvest.(32) There are several other reasons why the INTUC leadership vacillates on the question of rationalization. First, since the workers are almost unanimously opposed to it, the competition with the other trade union federations by necessity prevents the

(28) Myers, Labor Problems, op. cit., p. 88.

(29) AITUC, Resolutions of the General Council, Nagpur, Nov. 14-18, 1954 (New Delhi: Trade Union Publication Series, No. 15, Jan. 1955).

(30) Myers, Labor Problems, op. cit., p. 86.

(31) Indian Worker, October 2, 1955, p. 7.

(32) K. B. Pannikar, On Rationalisation - Report Submitted to the General Council of the AITUC, Nov., 1954 (New Delhi: Trade Union Publication Series, No. 17, Feb., 1955), p. 17.

INTUC from strongly supporting rationalization. (33) Second, many local INTUC organizations are strongly opposed to rationalization, and have gone so far as to break away from the national INTUC over this issue.(34) Finally, the INTUC leaders fear that the increased production at lower costs which will result from rationalization will hurt the small cottage industries which the Ghandist INTUC favors.(35) This is particularly true of rationalization in the cotton textile industry, the main arena of struggle.

Whatever the reasons for union opposition, it is clear it has have played a key role in limiting the introduction of more efficient equipment and techniques. This represents a sharp contrast with the work of the Chinese trade unions, which serve as a mechanism for implementing and encouraging the initiation of rationalization.

C. Strikes and Labor Discipline.

Chinese trade unions have no positive functions as to strikes, since all strikes in China, whether against public or private enterprises, are effectively prohibited. The labor law of China provides that all disputes must be settled by mediation and/or arbitration. It further stipulates that:

> After a dispute has broken out, both parties, during the period of consultation, mediation or arbitration shall maintain the status quo in production. The management should not resort to a lockout...Labor shall also maintain production and observe labor discipline.(36)

The Chinese trade unions are by law specifically charged with maintaining labor discipline, i.e., insuring the fulfillment of work quotas, limiting absenteeism, etc. Thus, one of the duties of the trade unions is to: "educate and organise the masses of workers and staff members to adopt a new attitude towards labor, to observe labor discipline... "(37)

In contrast to China, the strike is an important function of all the Indian trade unions, although there is much variation among the trade union federations in their willingness to use this power. The Congress-dominated INTUC, in line with the Indian government's attempt to limit strikes in order to fulfill the development plans, places most of its emphasis on conciliation and arbitration, and relatively little on strikes. Thus, the president of the INTUC stated recently: "Strikes and lockouts should have little scope when a democratic plan is being implemented. Therefore, when a plan is in progress a machinery must be created to settle disputes peacefully without any stoppage of production."(38)

The other three trade union federations place much greater emphasis on the strike. Another similarity among these three federations, and one that places them at an opposite pole from the anti-class struggle INTUC, is that they view the strike not only as a means for gaining economic benefits, but also as a weapon in the class struggle. A succinct statement of this view appeared in an HMS- associated journal:

> Strikes and Satyagraha are the weapons whereby the exploited classes express their determination not to play the role assigned to them. When the class-consciousness grows sufficiently, when class organizations become sufficiently powerful, a decisive action can be fought more effectively under present circumstances through strikes and Satyagrahas rather than through attempts at violent overthrows... (39)

There can be no question that the INTUC endeavors strongly to curb strikes, and potentially represents an important mechanism through which the government can limit halts in production. Thus, the Working Committee of the INTUC recently subscribed to a Code of Conduct in which "Stoppages, indiscipline, and sabotage on both sides have been ruled out completely and rigid adherence to the awards and agreements has been advocated."(40) The efficacy of the INTUC to

(33) Charles A. Myers, "The Labour Problems of Rationalisation: The Experience of India," International Labor Review, LXXIII, No. 5 (May 1956), 441. Hereafter referred to as Myers, "Rationalisation,"

(34) Myers, Labor Problems, op. cit., p. 86.

(35) Myers, "Rationalisation," op. cit., 441.

(36) The Trade Union Law of the People's Republic of China (Peking: Foreign Language Press, 1951), Articles 11 and 13, pp. 31-32.

(37) Ibid., Article 9, p. 5.

(38) Indian Worker, Jan 1, 1958, p. 59.

(39) Cited in Myers, Labor Problems, op.cit., p. 82.

(40) Indian Worker, Jan. 1, 1958, p. 61.

limit strikes, however, is severely circumscribed by two factors. The first is the competition which exists between the INTUC and the other federations, a competition in which the willingness to call a strike frequently represents to the workers militancy on their behalf. The second is the ability of INTUC locals to override the national organization when these locals feel a strike is necessary. One example is reported from Nagpur, "where the textile workers went on a three-month strike early in 1956, protesting INTUC agreement with a large mill on rationalization."(41) Thus, in spite of the efforts of the INTUC, the strike is still a significant aspect of Indian industrial life.

V

CONCLUSIONS

From our comparative analysis of the Chinese and Indian trade union systems, it seems clear that the structure and functioning of the Chinese system is far better designed to promote economic development. This was shown by examining several spheres of trade union activity. Thus, in the area of wages, we saw that the Chinese trade unions are geared to ensuring that the governmental policy of linking wage payments to productivity is carried through effectively. The Indian trade unions are committed to higher wages, regardless of the effects on productivity, and frequently engage in production-losing strikes to gain these wage increases. Even the government-associated union, which would theoretically like to see wages linked to productivity, can do little about it because of the competition for workers' allegiance. Again, the Chinese trade unions represent a mechanism for encouraging increased labor productivity through labor emulation drives, rationalization improvements, etc. In contrast, Indian trade unions do virtually nothing about increasing labor productivity, except to inhibit it through opposing rationalization. Finally, the Chinese trade unions are an instrument for maintaining labor discipline and limiting absenteeism. Indian trade unions do not serve this function, and on the contrary, utilize strikes as a means of gaining benefits, and for the furtherance of political ends.

In conclusion, it should be emphasized that no value judgements are implied when we state that the Chinese trade unions are a far more efficacious mechanism for promoting economic development. Such a statement should not be taken to mean that Chinese trade unions are "better" than those of India, for it is clear that societies have other values and goals besides that of economic development, which has been the concern of this paper.

(41) Myers, Labor Problems, op. cit., p. 86.

REPORT OF THE NATIONAL PRESIDENT

1959-1960

Gil C. Alroy

Still under the urgent sign of expansion, the society has - during these nine months of tenure - gained three new chapters. We have reached out into the South, and have added some four hundred members to our ranks. We have also completed all but the formal steps for the admission of Cornell University and the University of Michigan, and have revived our activities at Princeton. The new strength was clearly demonstrated by the fact that all but two of our chapters participated in the first national convention to be held far away from the New York metropolitan area.

With each year we approach the anticipated critical stage at which the very routine of management and cohesion-maintenance becomes not merely more intense, but altogether different in kind. The development in that direction during my tenure has tended to tax the habitual course of work with increasing impact. When national leadership handles at one time - as has recently actually happend - a mass of scroll and key orders, correspondence concerning several new chapters, the mobilization of delegates for the convention, plus odd matters, it finds itself coping with a near-full-time job on top of the heavy commitments for graduate study programs undertaken by the national officers. It may well be that at least the technical aspects of national management require more than voluntary labor, or some different division of work among the national officers. We need not jot this one down for consideration at our next convention because it will surely impose itself on our attention as time goes by. I am pleased to note that the last convention has already tackled one aspect of this problem by channeling more of our records into the able hands of faculty advisors, who represent the continuity assurance of the society.

The shape of things to come projects itself slowly but definitely: in the very near future we will be truly national in our disperson, and many of our oldest members will increasingly enter the faculties, while more and more of them will leave the schools and join business and public administration. What this metamorphosis means for OXE is easily gathered if we but look back two years when there were only a few in graduate schools and none beyond. We have not thought of the implications contained in the inevitable change, and are as yet unprepared to take full advantage of the opportunities so close at hand.

It is customary to devote part of this report to an expression of gratitude for aid received. I find that there is so very much I should say here, and that there is so little space available to acknowledge the help, the friendship, and the sacrifices with which we were lavishly favored lately. Thank You and Good Luck, especially to Charles Siegman, who has taken a heavy load off my hands.

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MESSAGE FROM THE NATIONAL PRESIDENT

1960-1961

Charles Siegman

Permit me, first, to express my best wishes to the outgoing national officers and offer my thanks for a job well done, and to extend my welcome to my newly elected co-workers.

One of the most difficult aspects in assuming this office is that it follows the highly successful administrations of Messrs. Brown and Alroy. So much has already been accomplished by my predecessors and so much of the groundwork for the Society's future development has already been prepared by them, that it is a most difficult assignment to attempt to match their performance.

The credit for the growth of Omicron Chi Epsilon - from a single chapter in New York City five years ago into a national organization with sixteen chartered and active branches in colleges and universities in a number of states today - and its achievements during these few years, should, however, not solely be given to the former national officers. In its pioneering stages, Omicron Chi Epsilon has been fortunate to have received the encouragement, cooperation and interest from numerous individuals - both faculty members and students. May we, the new administration, continue to receive their active and devoted participation, for the Society's future advancement will depend mainly on the strength and activity of the Society's constituent parts - the local chapters.

Let us moreover not start coasting on our past laurels. The justification for the Society's present existence is not its past, but its future. Although substantial progress has already been attained, we must make every effort to advance and to improve even further.

There is a need to consolidate and strengthen the existing chapters, and to formulate and implement a stimulating and creative program of activities on the national, regional and local scenes.

There is a need to enlarge the number of chapters in the Society by organizing new and strong chapters on the major campuses throughout the country, especially in those areas where the Society has not yet penetrated.

There is a need to establish contact with the academic world, and to bring the existence of Omicron Chi Epsilon to the attention of other organizations and associations which have as their basic objective the furtherance of interest in economics.

There is a need to prepare ourselves for the potential problems which may arise as the national expansion of the Society takes place, and to seek solutions to these new developments.

There is a need to reestablish our relations with alumni members who have graduated from their respective chapters, and organize functions which will again attract their active participation in the affairs of the Society.

There is a need to enlarge and improve the Journal.

The new administration is presently devoting its attention and efforts on all these fronts. Needless to say, the national officers possess only limited abilities and time. In order that the Society may continue to blossom and reach full-maturity, and come closer to the full realization of its objectives, we require the assistance of all our chapters and all our members. May we count on your support?

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FIFTH ANNUAL CONVENTION OF
OMICRON CHI EPSILON
NATIONAL HONOR SOCIETY IN ECONOMICS
HELD AT HARVARD UNIVERSITY, FEBRUARY 27, 1960

MINUTES:

The convention was called to order at 7 p.m. by President Gil C. Alroy. Present were delegates from fifteen chapters and observers from the University of Michigan and St. Peter's College.

It was MOVED and PASSED UNANIMOUSLY that St. Peter's College be admitted to the Society as Pi Chapter.

The convention observed a moment of silence in memory of the late Professor Patrick De Turo, formerly faculty advisor to the Iota Chapter.

Mr. Alroy presented the President's report. Mr. Andrew R. Blair presented the Secretary-Treasurer's provisional report. The report for the full fiscal year will be presented to the Committee on Audit during the summer. Mr. Enzo Allegretti presented the report of the Editor-in-Chief of the Journal of Omicron Chi Epsilon.

It was MOVED and PASSED UNANIMOUSLY that Mr. Alan A. Brown, founder and Charter President of the Society, be granted the title of President-Emeritus for life and that a suitable scroll be presented to Mr. Brown to that effect.

It was MOVED and PASSED that the Convention recess prior to the election of National Officers.

After reconvening, the Convention elected the following officers for 1960-1961:

President: Mr. Charles Siegman, Theta Chapter
National Secretary-Treasurer: Mr. Joseph Naus, Zeta Chapter
Editor-in-Chief: Mr. Nassau Adams, Zeta Chapter

Regional Vice-Presidents:
New York Region: Mr. Fred Casey, Kappa Chapter
New England Region: Mr. John Donovan, Mu Chapter
Central Atlantic Region: Mr. Robert Beyer, Pi Chapter
Southern Region: Mr. William Strevig, Omicron Chapter

It was MOVED and PASSED that the National Executive Board appoint Regional Vice-Presidents for the North Central and Western Regions.

It was MOVED and PASSED that the President be instructed to select the site of the Sixth Annual Convention and that he prepare a choice of three alternative sites for the Seventh Convention to be considered by the Sixth Convention.

It was MOVED and PASSED that each chapter submit a list of candidates and qualifications for national office to the President prior to the next convention.

It was MOVED and DEFEATED that the National Executive Board be instructed to submit a quarterly progress report to the chapters.

The Convention formally commended the National Officers and the Arrangements Committee for their services to the Society.

The Convention ADJOURNED at 11 p.m.

Respectfully submitted,
Andrew R. Blair,
National Secretary-Treasurer

Supplement to Vol. IV - Number 1

of

THE AMERICAN ECONOMIST

Journal of Omicron Chi Epsilon
National Honor Society in Economics

CHAPTER NEWS AND REPORTS

ALPHA CHAPTER - THE CITY COLLEGE OF NEW YORK

by Joel Gemunder

The Alpha Chapter, as in the past, has continued with its free tutoring service in the basic Economics Courses. Many hours of this expert tutoring are given to lagging students in Economics.

Another project which is in progress is a tea which will be given on April 29, 1960. The Alpha Chapter has invited all the other chapters of the New York Region, and also past members, some of whom are now graduate students. We hope that this tea will help satisfy the need for greater contact among the various chapters and members.

The Alpha Chapter, as in the past, is providing leadership for the large Economics Society at The City College (uptown). Joel Gemunder, President of the Chapter for the fall term - 1959, is President of the Economics Society. Richard Klein, President of the Alpha Chapter for the spring term - 1960, is also the Vice President of the Economics Society. Mike Mellen is Treasurer of both organizations.

The graduating members of the Chapter have again shown a strong desire to continue their studies:

Joel Gemunder has won a full tuition scholarship to the Graduate School of Business in the University of Chicago.

Morton Kamien, the Vice President of the Chapter, has won a large fellowship to study Econometrics in Purdue University.

Thomas Prapas is going to attend the Graduate School of Economics of the University of Chicago. Tom is also a member of Phi Beta Kappa.

Richard Klein is going to attend the Graduate School of Business in Dartmouth College.

Frank Louie, the Secretary of the Alpha Chapter, is going to attend the Graduate School of Economics in Columbia University.

The Alpha Chapter is also pleased to announce that it has accepted eight new members, mostly Juniors, who will be able to continue the functions of the organization next year.

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BETA CHAPTER - MANHATTAN COLLEGE

by Charles Cavaliere

The year 1959 has been a successful one for Manhattan College, the Beta Chapter. In the beginning the Beta Chapter was comprised of only one active member on campus. By the end of the year, however, four new members were inducted. Three of these new members are seniors. They are: Daniel Bryne, who won an N.D.E.A. Scholarship, which is primarily a fellowship for a Master's and Doctorate degree. He will attend the University of Michigan Graduate School. The other two seniors are Michael Flaherty and Frank Lynch. The fourth member inducted is Donald Greene, who is a junior here at Manhattan College.

To begin the new year, the Beta Chapter in conjunction with the Economics Finance Society is sponsoring an economic forum. The date has not yet been set. All chapters in the New York Metropolitan vicinity are cordially invited.

Thanks to the help of our moderator, Dr. Francis Ulrich, a look into the future holds in store for the Beta Chapter a prosperous and active year.

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GAMMA CHAPTER - FORDHAM UNIVERSITY

by Werner J. Zumbrunn

The past academic year at Fordham has been a fairly active one for Gamma Chapter. Bi-monthly meetings were held and these covered a variety of events. Speakers from the Steelworkers' Union and Seagram's Industry addressed the group. Individual members presented papers, although the majority of the meetings were taken up by panel discussions on current happenings in the field of Economics.

In the beginning of the Spring Semester, six new members were admitted into the Chapter. At the same time we regret that there are no National Officers of OXE from Fordham this year. Let us take this opportunity to congratulate all those members of OXE who were elected to National Office and wish them a most successful year.

DELTA CHAPTER - QUEENS COLLEGE

by Susan Saffer

The Delta Chapter has completed its most successful year. Included in our programs were a combined meeting with the History Club at which an Economics professor spoke on Karl Marx, followed by a History professor speaking on the same subject but from a different view; a presentation by Philip Sassower, a new member, on Real Estate Syndications; a presentation of a paper on the Marshall Plan by Arnold Levine; and a discussion of Plan Chilean led by Paul Weber, a new member, who has just returned from Latin America where he spent nine months as a Fulbright student. The chapter also sponsored a speaker on U. S. aid to Latin America. We are also sponsoring Carmine de Sapio who will be speaking on May 3, 1960.

Philip Sassower is an Eco-Accounting major who intends to pursue the study of Law; John Beehler, Jr., an economics major, will enter the business world; M. Melinda Stivers will enter the field of statistics; Paul Weber will go to Columbia Graduate School where he will major in Latin American Affairs; Peter Lane intends to go to Law School; Arnold Levine will attend Columbia's School of Business, and Susan Saffer will be going to Johns Hopkins School of Advanced International Affairs to specialize in Western European Affairs. The graduate members with whom we have contact at the present time are Richard Kovner who will be spending next year in France working for an Import-Export firm, and Joseph Stern who will be entering graduate school to specialize in underdeveloped areas.

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EPSILON CHAPTER - HOFSTRA COLLEGE

by Bernard Rogenstein

Most important at Epsilon Chapter is the induction of seven new members. Also of interest are the future plans of our present members. They are divided between a continuance of their education or entrance into the business world, or in some cases, both.

Roger Opdahl is now an Instructor in Economics at Geneva College in N.Y. and Bernard Smyth will study Labor Relations at Syracuse University. He has also received the appointment of Resident Advisor while there. Ronald Green will enter St. John's Law School in the fall and our past President, Robert Rexrode will enter N. Y. State Medical School at Albany. The Vice President, Gus Mezzeta, will begin working as a Securities Analyst while working for his M.B. A. at N.Y.U. John Higgins, our Treasurer, will be doing the same. Michael Murray is going to work for Conn. General Life Insurance Company as a Management Trainee. The President, Bernard Rogenstein, is going to work for the government for the next two years. He is going to be a 1st Lt. in the U. S. Army, Medical Service Corps.

Hofstra College is looking forward to the future and expects that Omicron Chi Epsilon will continue its fine work in stimulation of the study of economics and recognition of scholarship in the field.

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ZETA CHAPTER - HARVARD UNIVERSITY

by Carl H. Stem

The Zeta Chapter of Omicron Chi Epsilon is concluding its third year of activities this spring at Harvard University. In November it sponsored a meeting with Professor John K. Galbraith speaking on the "Current Market for Economists." In February a meeting was held to plan the arrangements for the National Convention which the Zeta Chapter hosted this year. Professor Thomas C. Schelling addressed the opening meeting of the Convention on "Economics and National Defense." Other activities during the year included establishing some twenty seminars to hear student papers and the publication of a student directory.

Chapter officers for the past year have been: Carl H. Stem, President; Walter G. Falcon, Graduate Vice-President; Julius B. Levine, Undergraduate Vice-President; Stephen M. Rosenkranz, Secretary and Robert F. Dernberger, Treasurer.

New members who were elected during the past year include: J. L. Rubenstein, J. H. Stone, Chitranjan Kapur, L. P. Robbins, R. E. Rubin, S. G. Rubenstein, J. I. Naus, W. A. Lovett, N. A. Adams, Robb Burlage, P. V. Miller, Charles Toder, L. A. Ryder, Johannes Hirschmeier, N. M. Edelson, S. L. Goldblatt, R. S. Ozaki, and M. S. Feldstein.

Two of our members were elected to National Offices at the National Convention. Joseph I. Naus was elected National Secretary-Treasurer and Nassau A. Adams was elected editor of the Journal of OXE.

Julius B. Levine, past vice-president, has received a Rhodes Scholarship to attend Oxford University. He will take up residence at Magdalene College in October. James Stone and Chitranjan Kapur will attend the Harvard Business School next year. Clive S. Gray, Robert Hartman, Gordon R. Munro, Douglas C. Dacey, and Michael D. Tanzer have been appointed Teaching Fellows at Harvard and will be working on theses. Gordon Munro has received a resident fellowship from the Imperial Oil Company of Canada to write a thesis on "The Evolution of the British Foreign Exchange Control System in the Postwar Era." Robert S. Ozaki has been appointed Assistant Professor of Economics at Alemeda State College in California. Johannes Hirschmeier will teach economics at Nanzen University in Japan. William R. Hughes has received appointment as Assistant Professor of Economics at Wesleyan University in Connecticut.

Alan A. Brown has been appointed a fellow of the Russian Research Center at Harvard and has received a Ford Fellowship to take up residence in Geneva, Switzerland for work on his Ph.D. thesis, "Foreign Trade in the Soviet Bloc." Leonard J. Kirsch will be working on his thesis at the University of Moscow, having received an Inter-university Travel Grant for next year. Reginald Green will be doing research on the economy of British West Africa while in residence at the University College of Ghana for 1960-61. Richard Kaufman will return to Israel to finish his thesis while Robert Dernberger will work on his at Harvard as a Ford Fellow.

Thomas A. Wilson had a paper published last November as Study Paper No. 3 of the special subcommittee on Employment, Growth and Price Levels, Joint Economic Committee, U. S. Congress, entitled "An Analysis of the Inflation in Machinery Prices." A Technical Note was published as "Productivity and Output in the Postwar Period." Gary Fromm published Study Paper No. 2 of the same Joint Economic Committee study with O. Eckstein entitled "Steel and Postwar Inflation." Other publications by Gary Fromm over the past year have been "A Simulation of the U. S. Economy in Recession," (Abstract), Econometrica, April, 1959, with J. S. Duesenberry and O. Eckstein; "Stability and Instability in the American Economy," Econometrica, January, 1960, with J. S. Duesenberry and O. Eckstein and "Economic Implications of the Steel Settlement," Business Scope, January, 1960.

Officers elected to serve the chapter during the 1960-61 academic year are: Martin S. Feldstein, President; Robert Hartman, Graduate Vice-President; Noel M. Edelson, Undergraduate Vice-President; and Robert Dernberger, Secretary-Treasurer.

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THETA CHAPTER - COLUMBIA COLLEGE

by David S. Friedberg

Theta Chapter of Columbia College will conclude the current year's activities with a dinner on April 25 at the Men's Faculty Club. At this affair, an annual event of our Society, our guest speaker will be Professor Carter Goodrich of the Graduate Economics Department.

In addition, we will formally induct ten new members and elect the officers for the coming year.

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IOTA CHAPTER - ST. FRANCIS COLLEGE

The past year at St. Francis has been an active one. In May, 1959, we had five active members, and a solid organization has been founded in the Economics Department of St. Francis.

Our present faculty moderator, Dr. Alfred Bornemann, Chairman of the Economics Department, and Chapter President Joseph Shelly have continued the policy of informal meetings at least once a month.

In February, one of our members, Bill McCormick, was elected to the Duns Scotus Society of St. Francis College. This is the highest honor that the school can bestow on a student.

Member Jim McAllister, who is top man in the graduating class, has won the Thomas Moore Fellowship (three years) and will continue on to law school.

The Chapter will lose nine of its members in June via graduation. The nine are: James McAllister, who is headed for law school; William McCormick for a career in teaching; John Finan, Thomas Byrnes, Robert Mitchell and Patrick Russo to take graduate work at New York University in the fields of Retailing, Management, Public Administration, Economics and Labor Relations; James Wachter and Robert Hurley are going into Public Accounting with the thought of an eventual C.P.A.

At the present time we are anxiously awaiting the publication of a manuscript entitled "Economics and War" written by our moderator, Dr. Alfred Bornemann.

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KAPPA CHAPTER - ST. JOHN'S UNIVERSITY

by Frederick B. Casey

In April, 1959 Kappa Chapter sponsored a buffet dinner and forum held at St. John's auditorium. The topic for discussion was "A New Look at the 1959 Forecasts" and guest speakers were Mr. Victor Farhi, City College of New York; Mr. James Essig, Prudential Life Insurance Co.; Mr. Carl Hemmer, S.J., Fordham University; and Rev. Bernard Tierney, C.M., St. John's University. Due to the success of this affair Kappa Chapter intends to hold similar forums in the future.

In January 1960 Kappa held its second annual induction dinner at which 34 new members were accepted. Guest speaker at the dinner was Mr. Ed Mennis of the Wellington Management Co. Mr. Mennis and Dean Weary of St. John's School of Commerce were inducted at this time as honorary members.

In March 1960 a Petroleum Economist gave a talk entitled "The Role of the Economist in the Business World" to the chapter members.

Recently the chapter was working in conjunction with St. John's University to arrange a seminar which was to be held this spring at our campus. Due to the prolonged illness of our Director of Public Relations this seminar has been postponed until the fall.

Joe Dehler (former National Secretary-Treasurer) is working on his Master's at N.Y.U. Jim Gorman (former President of Kappa) seems to be interested in doing his post-graduate work at St. John's. Ed Hyland (former Treasurer of Kappa) is working at Merrill, Lynch, Pierce, Fenner, and Smith. Dr. John Clark is still keeping a vigilant eye on our chapter and our thanks go to him.

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LAMBDA CHAPTER - TUFTS UNIVERSITY

by Wayne Starr

The Lambda Chapter has been rather active this year under Chapter President and Regional Vice-President, Wayne Starr. The year was started with five members, and only six new members have been admitted since, thus making the chapter one of the more "select" organizations on campus.

Our meetings have been high-lighted this year by the presentation of papers by the members. We have had very interesting and most informative discussions following the presentations, and have had an opportunity to discuss in an informal atmosphere any of the points which were particularly challenging. These meetings were open to the entire student body, and this has helped to generate interest in the field of economics.

Tufts University had a chance to display its campus to those delegates who attended the national convention. Tufts provided accommodations for those who desired them. We found ourselves very busy in working with the Harvard Chapter in organizing and carrying out this convention.

The Lambda Chapter is starting its own library, and is presently collecting books and pamphlets which are of interest to the members. We are planning a chapter banquet to be held either in late April or early May.

We would like to thank the faculty, and especially Dr. Harry Ernst, our adviser, for their work with the chapter. Lambda Chapter is aiming to advance and maintain the high level that economics has reached at Tufts.

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MU CHAPTER - BOSTON COLLEGE

by Robert Kelly

The Boston College Chapter of Omicron Chi Epsilon participated along with members of the Economics Academy in a series of lectures given by such notable economists as Robert Solow and Paul Samuelson, M.I.T.; Seymour Harris and Arthur Smithies, Harvard University; and Richard Caves, University of California.

At the last meeting of Mu Chapter, the members elected Robert J. Kelly President, John Donovan and Charles White Vice-Presidents, Paul Powers Secretary and Robert Tiernen Treasurer.

When the National Convention was held at Harvard, John Donovan represented the chapter and reported a most interesting and inspiring time.

As June is drawing closer and Commencement seems to be right around the corner, graduate school has called four members of Mu Chapter: Timothy Burns, University of Chicago; Robert Doyle, Boston College; William Melia, M.I.T.; and Daniel Murphy, Boston College. Robert Morrissey is our sole contender for Harvard Law School while John Walgreen aspires for Boston College Law School. Bob Berry is heading west to the First Securities Trust of Los Angeles and Dick Carton is entering the Army as a second lieutenant. At this writing Bob O'Leary, Donald Palmer, and Frank Pettee are still pondering their many business opportunities.

With plans being formulated for a very interesting semester ahead, we wish to thank the outgoing executive board for its assistance and advice which they have so willingly given us.

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OMICRON CHAPTER - UNIVERSITY OF HOUSTON

by R. H. Pentz, Jr.

The Omicron Chapter of Omicron Chi Epsilon held its regular monthly meeting on March 19, 1960. Eighteen members including the faculty sponsor, Prof. E. K. Zingler, were present.

President Byron Brown reported on his trip to the National Convention at Harvard. Regional Vice-President W. E. Strevig also submitted a report. Each received a vote of commendation from the members for his active role in publicizing the Graduate Program in Economics of the University of Houston.

National President Charles Siegman's letter to the Student Government of the University of Houston was received by that body with applause. In his letter President Siegman thanked the Student Government for providing the funds to enable Omicron Chapter's representatives to attend the National Convention. The Student Representative of Omicron Chi Epsilon, Mrs. Lee Kiser, reported that the Student Government wished to convey its thanks for this recognition.

Ten students whose grades and general qualifications would make them eligible to join Omicron Chi Epsilon were proposed for membership. These ten were considered individually; the members voted to extend invitations to all ten.

The group discussion included consideration of possible joint projects involving a substantial fraction of the total membership. Correlation of such endeavors with the work of the University Bureau of Business Research was agreed to be desirable. The President appointed a committee to investigate the possibilities of incorporating the information contained in the Bureau's files and of using its computer center in carrying out projects considered worthwhile by Omicron Chapter.

The members responded enthusiastically to an invitation by the President to attend a "Dutch Treat" social meeting (including wives) at his home in the near future. A definite date is to be set later.

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PI CHAPTER - ST. PETER'S COLLEGE

by George Armbruster

Preliminary work for the organization of the Pi Chapter of Omicron Chi Epsilon, at St. Peter's College, was begun in September, 1959. At first, there was some question as to the exact function which Omicron should perform at St. Peter's, since the Aquinas Economic Council was already solidly established and had similar objectives. Thus, it was agreed that Omicron Chi Epsilon should not supplant the previously existing club, but act as a vanguard and honor society of the Aquinas Economic Council. With the basic problem overcome, the Pi Chapter was formally recognized on February 27, 1960, at the National Convention at Harvard.

Having at this time ten members, Pi Chapter will be losing five this year through graduation. Bill Toner has received a scholarship to Boston College, for his Master's in economics, and Jay Gallagher has a grant to Wharton School. Bob Beyer and Ronny Mazzone will be joining the Army as Second Lieutenants.

At present the Pi Chapter is making plans to enlarge its membership and also has on the agenda a chapter dinner for the end of the spring semester.

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NATIONAL CHAPTERS

Alpha: City College of New York
Faculty Adviser: Professor Edwin Reubens
Chapter President: Joel Gemunder

Beta: Manhattan College
Faculty Adviser: Professor Francis Ulrich
Chapter President: Charles Cavaliere

Gamma: Fordham University
Faculty Adviser: Professor Charles Walsh
Chapter President: Werner Zumbrunn

Delta: Queens College
Faculty Adviser: Professor William Hamovitch
Chapter President: Miss Susan Saffer

Epsilon: Hofstra College
Faculty Adviser: Professor Lynn Turgeon
Chapter President: Bernard Rogenstein

Zeta: Harvard University
Faculty Adviser: Professor Arthur Smithies
Chapter President: Carl H. Stem

Eta: Princeton University
Faculty Adviser: Professor Lester V. Chandler
Chapter Representative: Gil Alroy

Theta: Columbia University
Faculty Adviser: Professor Peter Kenen
Chapter President: Harald Hostmark

Iota: St. Francis' College
Faculty Adviser: Professor Alfred Bornemann
Chapter President: Joseph Shelly

Kappa: St. John's University
Faculty Adviser: Professor John Clark
Chapter President: Fredrick Casey

Lambda: Tufts University
Faculty Adviser: Professor Harry Ernst
Chapter President: Wayne Starr

Mu: Boston College
Faculty Adviser: Professor Alice Bourneuf
Chapter President: Frank Pettee

Nu: University of Pennsylvania
Faculty Adviser: Professor David Motter
Chapter President: Miss Beatrice Reeves

Xi: University of Texas
Faculty Adviser: Professor Edward Hale
Chapter President: William Wagoner

Omicron: University of Houston
Faculty Adviser: Professor Ervin K. Zingler
Chapter President: Byron Brown, Jr.

Pi: St. Peter's College
Faculty Adviser: Professor Palmer C. Sae
Chapter President: Robert Beyer